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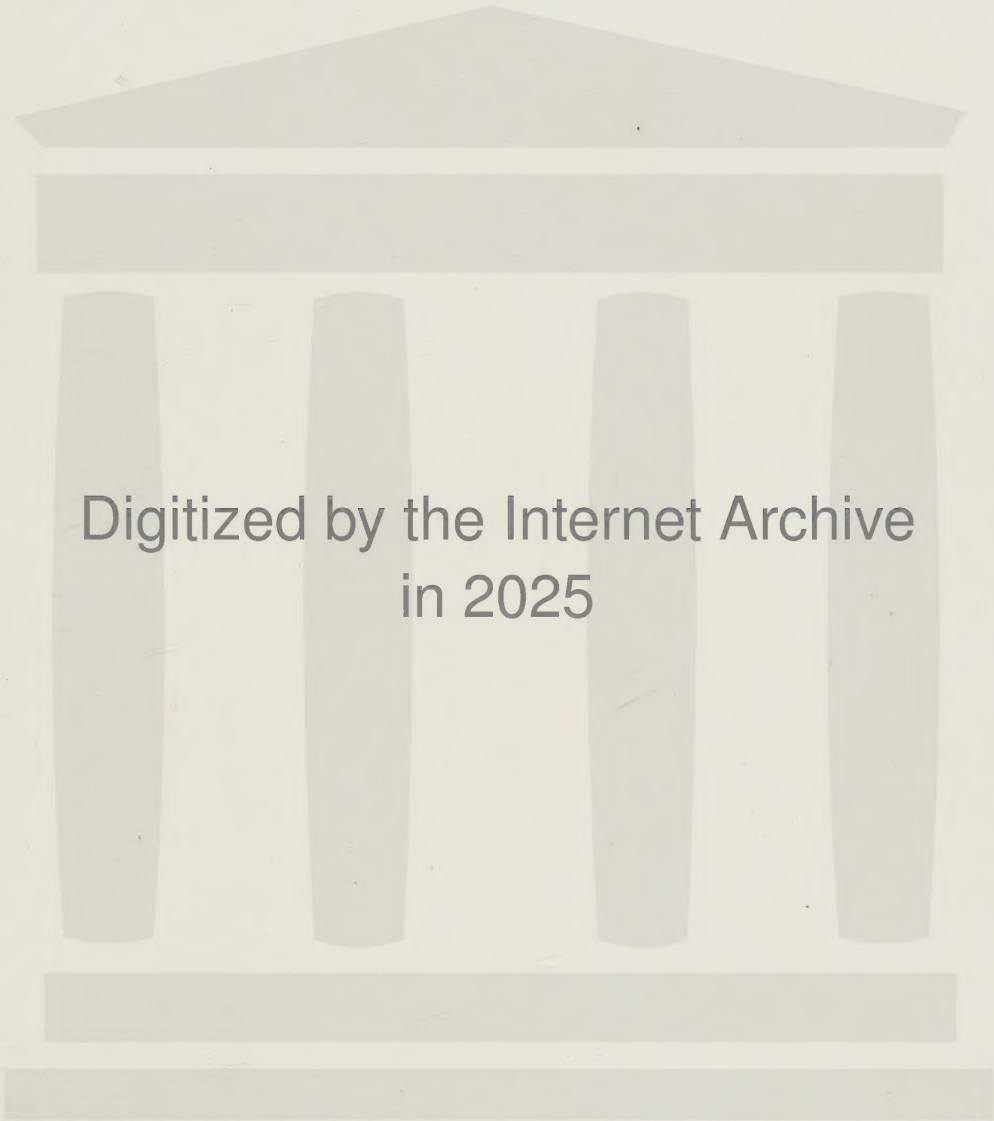
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1, Aganisia tricolor. 2, Coryanthes macrantha. 3, Miltonia Blunti. 4, Nanodes Medusæ. 5, Dendrobium Brymerianum. 6, Brassia caudata var. hieroglyphica. 7, Cattleya Trianæ var. purpurata. 8, Masdevallia spectrum. 9, Laelia elegans var. Houttsana. 10, Coelogyne pandurata. 11, Taphinia Randi.

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TO THE

NEW WERNER TWENTIETH CENTURY EDITION

OF THE

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IN FIVE VOLUMES

VOLUME XXVIII

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1905

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MALACCA—MALICIOUS PROSECUTION

MALACCA. See STRAITS SETTLEMENTS, Vol. XXII, p. 615.

MALACOSTRACA. See CRUSTACEA, Vol. VI, pp. 558–590.

MALAKOFF, a Crimean fort taken by the French troops, Sept. 8, 1855. See FORTIFICATIONS, Vol. IX, p. 404, and MACMAHON, in these Supplements.

MALAGHETTA. See AFRICA, Vol. I, p. 241.

MALAN, CÆSAR HENRI ABRAHAM, a Swiss Protestant clergyman, born in Geneva, July 8, 1787. He was a pastor of a state church, but came under the influence of Trinitarians, whose views he embraced and through whose influence he established himself in an independent church in Geneva. He is best known on account of his hymns, of which he composed a great many. Among his publications are *The Church of Rome* (1844); *Stories for Children* (1852); and *Pictures from Switzerland* (1854). His principal collection of hymns is *Chants de Zion* (1826). He died May 8, 1864.

MALAR LAKE. See SWEDEN, Vol. XXII, pp. 774, 775.

MALAYAN LANGUAGE. See TAMILS, Vol. XXIII, p. 47.

MALCOLM. See SCOTLAND, Vol. XXI, p. 501.

MALCOM KHAN, PRINCE NAZEM UD DOWLEH, a Persian statesman; born in Ispahan, Persia, 1832. In 1872 he occupied a post second to Grand Vizier. In this capacity he introduced many reforms, and in consequence was created Nazem ud Dowleh, one of the highest ranks in the land. After accompanying the Shah on his visit to Europe, he became Persian minister successively at London, Berlin, Vienna and other countries; and was sent as Persian Plenipotentiary to the Congress of Berlin, 1878. In 1889 he resigned his London embassy on account of personal differences with the acting Grand Vizier, and retired to private life. He devoted a great portion of his time to modifying the Arabic alphabet and improving the system of public instruction.

MALCZEWSKI, ANTON. See POLAND, Vol. XIX, p. 316.

MALDEN, a city of Massachusetts, on the Boston and Maine railroad. It was incorporated as a city in 1882. The Boston Rubber Shoe Company situated here has the largest factory of the kind in the United States. Other manufactures are cords, emery paper, leather, lasts, boot-trees and carpets. Combined capital of industries reporting in 1900, $5,906,279; value of annual products, $7,959,292. The public library has 38,000 volumes. It has electric lights and electric street-railway. Population 1890, 23,031; 1900, 33,664. See also MALDEN, Vol. XV, p. 330.

MALET, SIR EDWARD BALDWIN, a British diplomatist; born in The Hague, Oct. 10, 1837. He was educated at Eton, and at Corpus Christi College, Oxford, and entered the diplomatic service in 1854. During the Commune he was *chargé des archives*, was made Commander of the Bath, July 10, 1871, and promoted to be secretary of legation at Pekin in August of the same year. From 1873 to 1875 he was acting *chargé d'affaires* at Athens, and then proceeded to Rome as secretary of embassy. On April 20, 1878, he was appointed minister plenipotentiary at Constantinople, in the absence of the ambassador. The following year he went to Egypt as agent-consul-general, and a minister plenipotentiary in the diplomatic service; was made Knight Commander of the Bath in 1881, and received the medal and Khedive's star for his services in Egypt in 1882. In August, 1883, he was promoted to be envoy extraordinary and minister plenipotentiary at Brussels, and ambassador at Berlin, Sept. 20, 1884. Sir Edward Malet was sworn a Privy Councillor in March, 1885, and in June of the same year was decorated with the Grand Cross of St. Michael and St. George. Retired, 1895.

MALHEUR, a river of eastern Oregon, rising in Harney County, by several branches, and flowing E.N.E. to the Snake River on the state boundary near lat. 44° 4′ N.; length, about 175 miles.

MALHEUR LAKE, a body of water without an outlet, in Harney County, Oregon, from ten to eighteen miles in diameter. It receives the waters of Silvies River and of Dunder and Blitzen River.

MALIBRAN, MARIA FELICITA, a French operatic singer; born in Paris, March 24, 1808. She was the eldest daughter of Manuel Garcia, a Spanish tenor singer. She made her *début* in 1825 at the opera in London, and in the following year removed to New York, where she married M. Malibran, a French banker, from whom she was divorced by the French courts in 1834, and shortly afterward married the celebrated violinist, M. de Beriot. She subsequently appeared in London, Naples, Vienna, Milan, and Venice. She was a great actress as well as a marvelous singer. She died in Manchester, England, September 23, 1836. In 1838 a statue was erected to her memory in Brussels. W.M.C.

MALIC–ACID SERIES. See CHEMISTRY, Vol. V, p. 495.

MALICE, in law. See CRIMINAL LAW, Vol. VI, p. 520; LIBEL AND SLANDER, Vol. XIV, p. 504; MURDER, Vol. XVII, pp. 58, 59; and TORT, Vol. XXIII, pp. 482, 483.

MALICIOUS PROSECUTION, an unwarrantable criminal prosecution made by one person against another. Persons guilty of malicious prosecution are answerable in damages to the person against whom the prosecution was directed. In order to sustain an action for damages resulting from

malicious prosecution, it is necessary that the proceedings complained of shall have been regular and before a tribunal authorized to inquire into the charge made and punish the supposed offender. The plaintiff must show affirmatively that he was prosecuted by the defendant, that he was discharged in the final determination of the suit, and that the prosecution conducted against him was malicious and without probable cause. The jury may award exemplary damages as a punishment for the offense. See also TORT, Vol. XXIII, p. 483.

MALIGNANT PUSTULE. See WOOL-SORTERS' DISEASE, Vol. XXIV, pp. 698–699.

MALINCHE OR MALINTZIN MOUNTAIN. See TLAXCALA, Vol. XXIII, p. 449.

MALINES OR MECHLIN, a town of BELGIUM; q.v., Vol. XV, pp. 784–785.

MALLARD DUCK, the common wild duck (*Anas boschas*) of America and Europe. It is the original stock of most varieties of domestic ducks. In some countries it is known as "green-head." See DUCK, Vol. VII, p. 437.

MALLEABILITY. See METALS, Vol. XVI, pp. 69, 70.

MALLEE BIRD, the native pheasant of Australia. See MEGAPODE, Vol. XV, pp. 836, 837.

MALLERY, GARRICK, an American ethnologist; born in Wilkesbarre, Pennsylvania, April 23, 1831. He was graduated from Yale College in 1850, and from the law department of the University of Pennsylvania in 1852. He was admitted to the bar in 1853 and practiced in Philadelphia. In 1861, during the Civil War, he enlisted as first lieutenant, was twice promoted, was taken prisoner and for a time was confined in Libby prison. He then entered the regular army, was promoted to lieutenant-colonel, and during the reconstruction period in Virginia was secretary of state. He was executive officer of the Signal Service Bureau until 1876, when he was engaged in a geological survey in Dakota, and in 1879 was retired from the army and appointed chief of the bureau of ethnology. Among his published works are *A Calendar of the Dakota Nation* (1877); *Israelite and Indian, a Parallel in Planes of Culture* (1889); *Greeting by Gesture* (1891); *Picture Writing of the American Indians* (1893). He was a member of various scientific societies and for several years was president of the anthropological section of the American Association for the Advancement of Science. He died in Washington, October 24, 1894. W.M.C.

MALLET, DAVID, an English poet; born in Perthshire, in 1700. He was a friend of Pope and Bolingbroke, was brought under the notice of Frederick, Prince of Wales, who made him his under-secretary. He was occasionally employed as a public writer by the government, and Bolingbroke made him a bequest of his works in MS., which he published in 1754. His poetical works were collected and published in three volumes. He died in London, in 1795. W.M.C.

MALLET, JULES THEODORE ANATOLE, a Swiss civil engineer; born in Geneva, in 1837. He removed with his parents to Paris, where he was given a scientific education. He soon became prominent as an engineer through his connection with the building of the Suez canal and was appointed in 1880 editor of *The Proceedings of the Society of Civil Engineers of France*. In 1886 he invented the four cylinder compound locomotive. In 1877 he won a prize offered by the French Academy of Sciences, and in 1885 received the decoration of the French Legion of Honor. W.M.C.

MALLEUS. See EAR, Vol. VII, pp. 511, 512.

MALLOCK, WILLIAM HURRELL, an English author; born in Cockington, Devonshire, in 1849. He is a nephew of James Anthony Froude, the historian. He studied under a tutor and was graduated from Balliol College, Oxford, winning the Newdigate prize in 1872 for his poem, *The Isthmus of Suez*. He never entered a profession, but has devoted himself entirely to literature. His philosophical and sociological works include *Is Life Worth Living?* (1879); *Social Equality, a Study in a Missing Science* (1882); *Atheism and the Value of Life* (1884); *Property and Progress* (1884); *Labor and the Popular Welfare* (1893); *Studies of Contemporary Superstition* (1895); *Classes and Masses* (1896); *Aristocracy and Evolution* (1898); *Doctrine and Doctrinal Disruption* (1900); *Religion as a Credible Doctrine* (1902). He has also written several works of fiction, including *The New Republic* (1877); *The New Paul and Virginia* (1878); *A Romance of the Nineteenth Century* (1881); *The Old Order Changes* (1886); *A Human Document* (1892); *The Heart of Life* (1895), and *The Individualist* (1899), and has published a translation of Lucretius *On Life and Death* (1878). His philosophical writings deal with the fundamentals of religion, arguing for supernaturalism and aiming to show that science alone supplies no basis for religious belief. His numerous sociological works have brought forth much criticism and considerable discussion in both Great Britain and the United States in the newspapers and reviews. W.M.C.

MALLOPHAGA. See LOUSE, Vol. XV, p. 26.

MALLORY, GEORGE SCOVILL, American religious editor; born in Watertown, Conn., June 5, 1838; graduated as valedictorian at Trinity College, where he became Adjunct Professor of Latin and later Brownell Professor of English. From 1866 till his death he was editor of the *Churchman*, which he made one of the most widely read religious journals in America. Died in New York, March 2, 1897.

MALLORY, STEPHEN RUSSELL, statesman; was born in the British West Indies probably about 1812, the son of Connecticut parents, and was brought to Florida in 1820. He became a lawyer, judge and collector of customs. From 1851 to 1861 he was a United States Senator, declining the Spanish ministry in 1858. In 1861 he cast in his lot with the Confederacy, and served it with extraordinary efficiency as secretary of the navy. In 1865 he was arrested as a prisoner of state, but was released on parole after a short im-

prisonment. He died at Pensacola, Fla., on November 9, 1873. W.F.J.

MALMAISON, France, a mansion between Paris and Versailles, five miles west of the metropolis. It is national property and a tourist resort, celebrated as having been the residence of Empress Josephine after 1798. It was erected on the site of *mala domus* (hence the name) so called because marauding Normans landed there in the 9th century. Here Josephine lived in retirement after her divorce; and here she died and was buried in 1814, a plain monument marking her grave. After his defeat at Waterloo in the following year, Napoleon passed five days at Malmaison before the journey which ended with captivity and death at St. Helena. C.L.S.

MALMSEY. See WINE, Vol. XXIV, p. 641.

MALONE, a post village and the capital of Franklin County, northeastern New York, 62 miles W. of Ogdensburg, on the Salmon River, and on the Central Vermont Railroad. It is the center of a large agricultural and lumber region, and manufactures woolen goods, paper, flour, tanned leather, men's clothing, and has foundries and machine-shops. The principal products of the vicinity are hay, hops, potatoes and dairy products, and in these and its manufactured goods it has a considerable trade. Population 1890, 4,986; 1900, 5,935.

MALOT, HENRI HECTOR, a French novelist; born at La Bouille, France, May 20, 1830. He was educated for the law, but turned his attention to literature; served under Didot on *Biographie Générale*, and wrote for *Journal pour Tous*. He gradually drifted to novel-writing, and in 1859 began a series, *Les Victimes d'Amour*, with *Les Amants*. The series was closed in 1866 with *Les Enfants*. His plots are laid, for the most part, in the time of the second empire. One of his most popular books is a story of children, *Sans Famille* (2 vols., 1878), crowned by the French Academy. He wrote over fifty volumes; among them being *Un Beau-Frère* (1869); *Un Curé de Province* (1872); *Les Batailles du Mariage* (1877); *Baccara* (1886); *Séduction* (1887); *Justice* (1890); and *Complices* (1893), translated into English and published in America under the title of *A Story Without a Moral*.

MALPLAQUET, a village. See FRANCE, Vol. IX, p. 513.

MALPRACTICE, the unskillful or wrongful practice of a physician or other person by means of which the health of the patient is injured. Willful malpractice occurs when the physician willfully administers medicine or performs an operation which he knows will result in injury or death. Criminal abortion is an example of willful malpractice. Negligent malpractice occurs when medicines are administered or operations performed so carelessly that injury results, or when, through gross negligence, the patient does not receive proper care. Ignorant malpractice is the act of administering injurious medicines while ignorant of their evil effect, when a well-educated or competent physician would have known that the result would be injurious to the health of the patient. Malpractice is a misdemeanor at law, and the person injured may also have a remedy by an action at law for damages sustained.

MALTA. The latest figures place the area at 95 square miles, and that of the neighboring island, Gozo, 20, making a total area (with Comins) of 117 square miles. Chief town and port, Valetta, strongly fortified, and with a population of about thirty thousand. In 1888, there were a university, a lyceum, and two secondary schools. The governor is appointed by Great Britain; salary, $25,000. Revenue in 1900, $1,783,790; expenditure, $1,829,715. The imports and exports (in transit), which in 1891 were $175,000,000 each, had fallen in 1899 to $30,000,000 each. Population, 1900, 183,679. See also MALTA, Vol. XV, pp. 342–346.

MALTHEIDÆ, the family of bat-fishes. The best-known member of the family is *Malthe vespertilio*. This fish is shaped curiously, the fins resembling frog legs. It lives in the water near the West Indies. Economically it is of no importance.

MALVACEÆ. See MALLOW, Vol. XV, p. 337.

MALVERN, a town and the capital of Hot Springs County, southwestern central Arkansas, 43 miles S.W. of Little Rock, on the St. Louis, Iron Mountain and Southern railroad, at the junction of the Hot Springs railroad. It is in a cotton, grain and fruit raising region, and has cotton-gins and grist-mills. Population 1890, 1,520; 1900, 1,582.

MALVERN, Iowa, a town and railway junction of Mills County, on Silver Creek, 14 miles east of the Missouri River, and 120 miles southwest of Des Moines on the Tabor & Northern, the Omaha & St. Louis, and the Chicago, Burlington & Quincy railroads. It is in a farming, fruit, and cattle-raising section, with milling, cold-storage, and exporting interests. Population, 1890, 1,003; 1900, 1,166. C.L.S.

MALVERN HILL, BATTLE OF, the last and fiercest of the "Seven Days' Fight" took place, July 1, 1862, at Malvern Hill, a town in Virginia, near the James River, about 15 miles southeast of Richmond. Here McClellan held a strong position on the top of a plateau, protected on one side by a steep ravine which was under fire of the gunboats on the Potomac, and on the other by long slopes up which Lee's army would be compelled to charge. Batteries were planted so as to command the slopes, and the troops were intrenched strongly behind fences, ditches and hedges. Lee ordered a charge by all parts of his line, but they were so far apart that the signal was not heard, and the attacks consequently were not in concert. Hill and Magruder bore the brunt of the fight, but were beaten off by the artillery-fire. Time after time they charged, but to no purpose. The battle lasted until nightfall, when McClellan retired to Harrison's Landing, where he restored communications. The Federal loss was less than half that of the Confederates.

MAMARONECK, a village of Westchester County, New York, in the southeastern part of the state. It fronts upon Long Island Sound, is about twenty miles from New York, and is reached by the New York, New Haven and Hartford railroad. Its population in 1900 was less than 3,000. W.F.J.

MAMELUKES OR MEMLUKS. See EGYPT, Vol. VII, pp. 655–663.

MAMIANI, COUNT CERENZIO DELLA ROVERE, an Italian statesman; born in Pesaro, Romagna, in 1800. He took an active part in the revolutionary movements in the Roman states which followed the accession of Gregory XIV to the pontifical chair. He became one of the provisional government in Bologna after the rising in the Romagna and was subsequently associated with Mazzini in a society of Propagandists. In 1848 he was one of the most active members of the moderate Liberal party, and on the formation of a constitution he accepted the presidency of the cabinet; but unable to stem the extreme revolutionary principles, he resigned and repaired to Turin, where, in conjunction with Grobert and others, he founded the Society of the Union of Italy. After the Italian war of 1859 he appeared in the parliament of Turin, and in 1860 was appointed minister of public instruction. The following year he was sent by the Italian government as ambassador to Greece, and in 1865 he represented the Italian nation at Berne, Switzerland. He died in Rome, Italy, May 21, 1885.

W.M.C.

MAMMARY GLANDS. See MAMMALIA, Vol. XV, p. 371.

MAMMEE APPLE, the delicious fruit of the West Indian *Mammea Americana*, a genus of the family *Guttiferæ*.

MAMUN. See AL-MAMUN, Vol. I, p. 519.

MAN. See MAMMALIA, Vol. XV, pp. 451, 452; and ANTHROPOLOGY, Vol. II, pp. 95–97.

MANAGUA LAKE. See NICARAGUA, Vol. XVII, pp. 490, 491.

MANAOAG, town and road center in Pangsinan, Luzon, Philippine Islands, 18 miles E. of Lingaven. Pop., 17,500.

MANÁOS, Brazil, the capital of the great northwestern state Amazonas, on the north bank of the Rio Negro, a short distance above its confluence with the Amazon, and at the head of ocean steamship navigation in the Amazon basin. The climate is temperate and healthful, and the city has a good water supply, electric lighting, and other modern conveniences; among many fine public buildings and institutions is the old established industrial training institute for Indians. Manáos is the principal gathering and distributing center of the manifold forest products of the Amazon basin (see BRAZIL), and is telegraphically connected with the rest of the world by the Amazon River cable. It originated in the early Portuguese Fortaleza da Barra. C.L.S.

MANASQUAN, a borough of Monmouth County, New Jersey, in the east-central part of the state. It fronts on the ocean, is reached by the Central railroad of New Jersey, and the Pennsylvania railroad, is a summer resort, and had in 1900 a population of 1,500. W.F.J.

MANASSAS JUNCTION, BATTLES OF. See BULL RUN, in these Supplements.

MANASSEH BEN ISRAEL, a Jewish Scholar; born at Lisbon in 1604; fled with his father from the Inquisition, and settling at Amsterdam became chief rabbi at the synagogue there. He believed that the Messianic time was at hand and that the ten lost tribes had been found in America. In 1656 he visited England, seeking to secure from Cromwell the readmission of the Jews. He published texts of various parts of the Old Testament, with notes. His various publications served to pave the way for the gradual return of the Jews to England. He died at Middleburg in 1659.

MANBY, GEORGE W. See LIFEBOAT, Vol. XIV, p. 576.

MANCHESTER, Connecticut, a town of Hartford County, in the central part of the state. It lies in the valley of the Hockanum River, a tributary of the Connecticut, and is a typical New England manufacturing town, its industries including woolen and silk goods, electrical apparatus and hardware. It is eight miles east of Hartford, is reached by the New York and New England railroad, and had in 1900 a population of 10,601. See also MANCHESTER, Vol. XV, p. 472. W.F.J.

MANCHESTER, Iowa, a city and the county seat of Delaware County, in the eastern part of the state. It lies in an agricultural country, near the head of the Maquoketa River, forty miles west of Dubuque, and is reached by the Illinois Central railroad. It has some industries, chiefly tributary to agriculture and dairying, and had in 1900 a population of 2,887. W.F.J.

MANCHESTER, Michigan, a village and township of Washtenaw County, at the junction of two divisions of the Lake Shore & Michigan Southern railroad, 60 miles southwest of Detroit. It is the trade and manufacturing center of a productive agricultural section, with a special output of fruit and celery, the industrial establishments include flouring mills and canneries, refrigerator, broom, and stone-boat factories. Population, 1900, of village 1,209, of township 937. C.L.S.

MANCHESTER, New Hampshire, a large manufacturing city of Hillsboro County, in the southern part of the state. It is on the Merrimac River, sixteen miles south of Concord, and is reached by three divisions of the Boston and Maine railroad. It has a fine water power secured from the river, and is the seat of some of the largest manufacturing establishments of New England, including the Amoskeag cotton mills. The manufacturing capital of the city is more than $22,000,000 and its yearly output is valued at more than $26,000,000. One-third of the inhabitants are employed in factories. The population in 1890 was 44,126 and in 1900 was 56,987. See also MANCHESTER, Vol. XV, p. 472.

W.F.J.

MANCHESTER, a post village of Adams County, central-southern Ohio, on the north bank of the Ohio River, 40 miles below Portsmouth. It is a shipping-point for farm produce, and has manufactories of flour, lumber and furniture. Population, 1890, 1,965; 1900, 2,003.

MANCHESTER, Vermont, one of the county

seats of Bennington County, a town 30 miles south of Rutland, built on rising ground above the Battenkill River, and at the foot of the Equinox Mountain, reached from Manchester Depot, two miles northeast on a division of the Rutland railroad. It is an educational center and a health resort with mineral springs and agricultural, manufacturing, and marble quarrying industries. Population, 1891, 1,907; 1900, 1,955. C.L.S.

MANCHESTER, Virginia, a city of Chesterfield County, in the east-central part of the state. It lies on the south bank of the James River, directly opposite Richmond, with which it is closely associated, and is reached by the Southern and the Atlantic Coast Line railroads. It is the market of a considerable agricultural region, and has extensive car and engine shops, flour and cotton mills, and other industries. Its population in 1900 was 9,246. W.F.J.

MANCHESTER, an English city (for general article on which, see MANCHESTER, Vol. XV, pp. 467–472). The Parliamentary borough of Salford is now virtually a part of Manchester, communication between the two being obtained by the numerous bridges crossing the river Irwell. Manchester, with Salford, covers an area of about 13,000 acres. The population of Salford in 1891 was 198,139, the population in 1901 of the municipal borough being 220,596; the population of Manchester in 1891 was 505,368, and by the census of 1901 it had reached 543,969. The population of Manchester, in a geographical sense, including the registration districts of Salford, Prestwich, Barton and Chorlton, and the subdistricts of Heaton Norris, Altrincham, Wilmslow and Hyde, was, in 1891, 999,000. The Parliamentary borough of Manchester contains six divisions, while the Parliamentary borough of Salford contains three divisions, each division returning one member.

The new Manchester Post-Office, in the Renaissance style, was completed in 1887 at a cost of $500,000. Potter's Park was presented to Manchester by the late Sir Joseph Whitworth and opened in 1889. The new race-course at New Barns is one hundred acres in extent, and has a grand stand capable of seating 2,700 spectators. Owens College, Manchester, was affiliated with Victoria University (founded 1870), and now occupies an extensive site of buildings, erected in 1884 at a cost of $350,000, with an additional block of buildings erected in 1887. In 1894 a considerable extension to the medical department was inaugurated. The Whitworth Institute was founded in 1888, and to it was transferred, in 1890, the technical school, the whole being devoted to technical instruction.

The Manchester Unity Friendly Society had, in 1894, an adult membership of 739,449, with 96,453 juvenile members. The total capital of the order is $45,300,000. In 1893 it was voted to admit females to membership.

In Manchester and Salford there were, in 1894, over 360 places of worship of various sects; about 120 of these belonged to the Church of England and five were Jewish synagogues. The diocesan population of Manchester is 2,644,424.

The 17 banks in Manchester and Salford showed, in 1894, a clearing-house turn-over of $807,500,000.

The water-works, gas-works and tramways belong to the corporation, the last being leased to a company.—*Water-works.* The works for the purpose of conveying water from Thirlmere, a distance of about one hundred miles, were commenced in 1885, carried out at a cost of $20,000,000, and formally inaugurated Oct. 13, 1894. The water is conveyed by tunnels and aqueduct to the neighborhood of Bolton and thence by pipes to Manchester. The daily supply is estimated at 50,000,000 gallons.—*The Manchester Ship-Canal.* The act of Parliament authorizing this undertaking was passed Aug. 6, 1885, and had for its purpose the connecting of Manchester with the sea by means of a canal capable of transporting the largest merchant steamers. The canal commences at Eastham, on the south shore of the Mersey, and extends by way of Runcorn and Warrington to Trafford bridge, Manchester, a distance of 35 miles, where docks covering 85½ acres were constructed. The total length of quays is six miles. The minimum depth of the canal is 26 feet, with a bottom width of 120 feet. The level of the docks at Manchester, 60½ feet, is reached by four sets of locks, each set comprising three locks, which are capable of being worked together. It takes eight minutes to accomplish the passage through a lock, the whole transit of the canal being made in eight hours. The canal is sufficiently wide to accommodate the Bridgewater and Runcorn canals, the former being carried over the ship-canal, with a swing aqueduct for the passage of vessels. The total cost exceeded $50,000,000. It was opened by the late Queen Victoria, May 24, 1894. See also CANAL, in these Supplements.

MANCHESTER NEW COLLEGE, England, a Unitarian institution established at Oxford since 1893, but not affiliated to the university. Although maintained chiefly by the Unitarian sect for students training for the ministry, no sectarian restrictions are imposed. The college originated in the old Warrenton Academy at Manchester, which changed its name to the Manchester Academy in 1786, and in 1803 removed to York. Thirty-seven years later it returned to Manchester and in 1853 became affiliated with the University of London. In 1889 its faculty moved to Oxford where convenient modern buildings were erected and opened in 1893. C.L.S.

MANCHESTER SHIP-CANAL. See CANAL and MANCHESTER, in these Supplements.

MANCHINEEL (*Hippomane mancinella*), a tropical American tree of the family *Euphorbiaceæ*, celebrated for the poisonous properties of the acrid milky juice with which every part of it abounds. A drop of this juice, which is of a pure white color, burns like fire if it falls upon the skin, and the sore which it produces is very difficult to heal. The Indians of tropical America

use it for poisoning their arrows. The fruit is not unlike a small apple, and the wood is well suited for cabinet-making.

MANCINI, Pasquale Stanislas, an Italian statesman; born in Ariano, March 17, 1817. He was graduated from the University of Naples and began the practice of law. In 1848, he became a member of the Neapolitan Parliament but because of his prominence in opposition to the king, was obliged to flee to Turin where he became professor of international law in the university of that city. He entered the Sardinian Parliament, and in 1862 was minister of public instruction. He subsequently took up his residence in Rome, where he became a member of the Italian Parliament; was made a professor in the University of Rome and was known as a leading lawyer with large practice. In 1873 he was sent as a delegate to the Peace Congress at Ghent and was chosen its president. He was minister of foreign affairs of Italy from 1881 to 1883. He published *Prelezioni di Diritto Internazionale* (1873) and *Projet de Code Penal Unique* (1877), and various political and legal papers and pamphlets. He died in Naples, Italy, December 26, 1888. W.M.C.

MANCO CAPAC, first Inca of Peru. See America, Vol. I, pp. 613, 615.

MANDAN, a city and the capital of Morton County, central southern North Dakota, about five miles W. of Bismarck, on the Northern Pacific railroad, and on the Missouri River, where it is joined by the Heart. It is in a stock-raising and coal-mining region, and ships much wool. Located here are railroad-car shops, a sash and wood-working factory and flour and feed mills. It is the seat of the state reform school. Population 1890, 1,328; 1900, 1,658.

MANDANS, a small tribe of North American Indians, living on a reservation of 8,640,000 acres, in the basin of Yellowstone and Powder rivers, in western South Dakota and eastern Montana. An annual appropriation of $75,000 is made for this tribe, together with the Hidatsa (Gros Ventres) and Arikara, who occupy the same reservation. Their number in 1895 was about 265. They are backward in civilization, although carrying on some agriculture. See also Indians, XII, 871.

MANDARA or WANDALA, a native state of Central Africa, east and south of Lake Chad, the principal portion, with the towns of Doloo and Mora, ancient capitals, now forming part of the German colony of Kamerun, east of Bornu, British Nigeria. C.L.S.

MANDAUE, a town of the Philippine Islands on N. shore of Cebú Channel, E. coast of Cebú. Climate hot but healthful; chief occupation, rice culture. Pop. 15,307.

MANDAVEE or MANDIVEE, the principal seaport town of Cutch, India, on the Gulf of Cutch, about 35 miles from Bhooj, or Bhuj. It is fortified, has an open roadstead, and an active trade with Sinde, Malabar, the Persian Gulf, Arabia and the west coast of Africa as far as Zanzibar, besides a large inland trade. Its exports comprise cotton, silk and other piece goods. Its imports are bullion, ivory, hides, dates, cocoanuts, grain and timber. Pop., 1896, 38,200. See also Cutch, VI, 645, 646.

MANDERSON, Charles Frederick, an American lawyer and legislator; born in Philadelphia, Pennsylvania, February 9, 1837. He studied law and was admitted to the bar in 1859. At the outbreak of the Civil War he enlisted as a private in the Union army and rose to the rank of brigadier-general of volunteers. He resumed his law practice in Omaha, Nebraska, in 1869. He was a member of the Nebraska constitutional conventions in 1871 and 1874 and in 1883 was elected to the United States Senate, serving until 1895. W.M.C.

CHARLES F. MANDERSON.

MANDOGARH or MANDU, a ruined city of India, formerly capital of the Mohammedan kingdom of Malwa, 15 miles N. of the Nerbudda and 38 S.W. of Indore. The ruins stretch for 8 miles along the crest of the Vindhya Mountains, and have a circumference of 37 miles. A deep, narrow valley separates them from the adjoining table-land. The least injured of the ruined buildings is the great mosque, which is reached by a handsome flight of stairs; it is said to be "the finest and largest specimen of Afghan architecture extant in India." There are also a massive royal palace and the white marble mausoleum of the king who raised the city to the acme of its splendor early in the fifteenth century. According to Malcolm, Mandogarh was founded A.D. 313.

MANDOLIN. See Lute, Vol. XV, pp. 72, 73.

MANEESA. See Manisa, Vol. XV, p. 497.

MANET, Edouard, a French painter; born in Paris in 1833; the founder of "impressionism," an attempt to avoid such compromises and conventionalities of lighting, composition, etc., as have been frankly accepted by the art of the past, and to render with absolute truth the personal and immediate "impressions" of nature. He received a second-class medal at the Salon of 1881, and the decoration of the Legion of Honor in 1882. His best pictures are *Boy with a Sword* (1861), and *Olympia* (1865). Died in Paris, April 30, 1883.

MANGALDAN, town in Pangasinan, Luzon, Philippine Islands. Pop. 16,143.

MANGANESE MINERAL, A New. A hydrous sulphate of the Epsomite group discovered by Mr. Iles in Colorado in 1882. It is composed of loosely adhering, friable, thick orthorhombic prisms, which frequently terminate in a truncated pyramid, with a slightly glimmering luster. The aqueous solution effervesces with sodium carbonate and reddens blue litmus paper. Its hardness is from .75 to 1, and its specific gravity is 2.167 See also Manganese, Vol. XV, p. 486.

MANGANESE STEEL. See Iron and Steel, in these Supplements.

ADMIRAL GEORGE DEWEY, U. S. N.

MANGE, a disease of the skin of cattle, horses, dogs, etc. See VETERINARY SCIENCE, Vol. XXIV, p. 213.

MANGEL-WURZEL OR MANGOLD-WURZEL. See AGRICULTURE, Vol. I, pp. 327–328.

MANHATTAN, a borough of the newly created city of New York (commonly spoken of as "Greater New York"), comprising the island of Manhattan and its naturally related small islands (Blackwells, Wards, Randalls, etc.); its boundaries being the Harlem river on the north, and the East and North rivers on its easterly and westerly sides respectively. The charter of the new city was passed by the legislature on April 13th, 1897, was signed by the governor on May 5th, and went into effect January 1st, 1898. The borough has eleven municipal courts which take the place of the former civil courts, the justices being elected for ten years and drawing salaries of $6,000 each. There are also seven city magistrates' courts, presided over by justices who are appointed for like terms and salaries as the municipal justices. The Manhattan Elevated R. R. system traverses the borough. Manhattan, with the borough of Bronx, furnishes twenty-one commissioners to the school board, which chooses ten delegates to represent the boroughs in the central board of education.

MANHATTAN, a city and the county seat of Riley County, Kansas, in the northeastern part of the state. It lies at the junction of the Big Blue and Kansas rivers, 51 miles west of Topeka, on the Union Pacific and the Chicago, Rock Island and Pacific railroads. It is in a farming and stock-raising country, and has important magnesian limestone, cement, marble and other industries, and manufactories of vehicles and building material. It is the seat of the Kansas State Agricultural College, a large and important institution. Its population in 1900 was 3,438. W.F.J.

MANHATTAN COLLEGE, in New York city, is a Roman Catholic institution for male students only, which was founded by the Brothers of the Christian Schools (q.v., Vol. XXV, p. 610) in 1853, soon after the advent of that order in the United States. It was first called the Academy of the Holy Infancy, but in 1863 was enlarged and raised to collegiate rank. It is chartered by the University of the State of New York, and is affiliated with various other Roman Catholic seats of learning. It had in 1904 a faculty of 38 instructors, 542 students, and a library of 10,600 volumes. Of its 994 graduates since its foundation, 879 were living. It had no endowment nor productive funds, but had an income of $47,000 a year from tuition fees, etc., the charges for tuition being from $75 to $100 a year for each student. The president is the Rev. Bro. Jerome. W.F.J.

MANHEIM, a post borough of Lancaster County, southeastern Pennsylvania, 10 miles N.W. of Lancaster, on the Philadelphia and Reading and the Cornwall railroads. It has manufactories of flour, carriages, castings, cigars, mill machinery, and lumber. Population 1900, 2,019.

MANIA. See INSANITY, Vol. XIII, pp. 109–113.

MANID. See MAMMALIA, Vol. XV, pp. 391–392.

MANIHOT. See CASSAVA, Vol. V, p. 159.

MANILA BAY, BATTLE OF. May 1, 1898, is a notable date in American naval annals, for on that May day a decisive encounter took place between the might of the United States and the obnoxious and waning power of Spain. Elsewhere in these Supplements (see article on the PHILIPPINES) it will be seen that Spain was engaged at this time in seeking to quell a native insurrection in Luzon, the chief island of the Philippine group; and when war broke out between the United States and the Spanish power, in consequence of its evil rule in Cuba, the Madrid government had a fleet in Philippine waters, under Admiral Montojo. At this period a squadron of the United States navy, under Commodore (afterwards Admiral) George Dewey, was likewise in Asiatic waters, and, when war was declared, it happened to be temporarily at Hong Kong. From that friendly harbor, according to the neutrality laws, it was notified (April 24) to leave by the British authorities, and instant effect was given to the command by Commodore Dewey, who repaired to Mirs Bay, thirty miles distant, to await the coming of the United States consul from Manila, and to proceed thither, by command of his government, to engage and if possible destroy the Spanish fleet, known to be in the vicinity of the Philippines. The consul having arrived, the fleet weighed anchor (April 27) and at once set out for the Spanish possessions. Dewey's command consisted of six fighting ships, the *Olympia* (flag), *Baltimore*, *Boston*, *Raleigh*, the gunboats *Concord* and *Petrel*, the despatch boat *McCulloch*, with two supply and coal vessels, the *Nanshan* and *Zafiro*. Early on Saturday (April 30) Point Bolinao, Luzon, was reached; and here the *Concord* and *Boston*, followed by the *Baltimore*, were sent to reconnoiter Subig Bay and learn the whereabouts of the Spanish fleet. Not finding trace of it there, the commanders of the various vessels were summoned to a council on board the *Olympia* and notified of Dewey's intention to enter Manila Bay with his entire command at midnight of Saturday. Despite the risks involved in this decision — for the channel was understood to be mined, as well as protected by land batteries and by the forts on Corregidor Island, at the entrance to the harbor — the fleet, with all exposed lights screened, passed the ordeal unscathed, though the action was not unobserved or unchallenged by the Spaniards, and slowly steamed across the bay and arrived off Manila at daybreak, where the fleet, as officially reported by Commodore Dewey, "was fired upon at 5:15 A. M. by three batteries at Manila and two at Cavité, and by the Spanish fleet anchored in an approximately east and west line across the mouth of Baker Bay, with their left in shoal water in Canacoa Bay." Dewey's fleet, already stripped for action, steamed down towards the Spanish arsenal and naval depot of Cavité, where the enemy's fleet lay, sheltered by the fort and land batteries. Here were the *Reina Cristina* (Montojo's flagship), the *Castilla*, *Don Antonio de Ulloa*, *Don Juan de Austria*, *Isla de Luzon*, two other warships,

two torpedo boats, one transport, with two tugs and several small launches.

As the American flagship advanced to the attack she opened fire at 5:41 A. M., followed by her consorts, and for the next two hours the fighting was continuous, and proved to be most disastrous to the enemy. The Spaniards fought heroically and determinedly, but their fire largely fell short and their gun-aim was bad. To a considerable extent it was also nullified by Dewey's tactics in keeping his ships in constant motion. Owing to the deep draught of most of the American vessels it was risky to approach very close to the enemy; even this risk, shortly afterwards, was run, and, after steaming up and down the bay, Dewey decided to steer closer to the Spanish ships and the forts on shore. This manœuvre incited Admiral Montojo to meet the *Olympia* halfway, only, however, to bring destruction upon the Spanish flagship, since it enabled Dewey to rake the *Reina Cristina* with a 250-pound percussion shell, which tore completely through her, setting her on fire, exploding her boilers, and, as was afterwards learned, killing the captain and nearly 150 of his men. The Spanish admiral now removed his flag to the *Isla de Cuba;* but this ship, with two others of the fleet, was set on fire, and one or two of the remaining vessels were either sunk or disabled. Content, so far, with the morning's destructive work, the American commander drew off into the bay to allow his men to get breakfast and a much-needed rest.

After about four hours' cessation, the battle was renewed, the *Baltimore* doing some effective work with her 6 and 8-inch guns, and the little *Petrel*, which was of light draught, and so able to get closer inshore, inflicting severe punishment upon the Spaniards. Soon it was seen that Montojo's fleet was past all fighting, and the remaining hour or two of the engagement was occupied in demolishing, and at length in silencing, the fort and water batteries.

Among the Spanish ships the havoc was great, but from none of them was a flag lowered, so desperate though futile was the resistance. Twice the *Olympia* was in serious danger, once from the explosion of a submarine mine, and a second time from the attacks of a couple of Spanish torpedo boats; but neither the flagship nor any American vessel sustained serious mishap, while there was, luckily, no loss of American life, and but seven men injured. Towards the close of the action, the *Baltimore* steamed close inshore, and, opening all her batteries, she destroyed the Cavité arsenal and blew up the powder magazine. The *Petrel*, meanwhile, supported by the *Boston* and the *Concord*, completed the destruction of the remainder of the Spanish fleet, and compelled the fort to surrender. A force was then sent ashore to take possession of Cavité, and to protect it and the hospital from being looted by the environing native insurgents. Governor-General Augusti, at Manila, was then communicated with, and ordered, at peril of the bombardment of the place, to desist from firing upon the American fleet, and from giving trouble in any way. As Augusti refused Dewey the use of the ocean cable from Manila, it was cut, and communication abroad ceased. The *McCulloch* was, however, despatched to Hong Kong with news of the victory to the authorities at Washington, an announcement which electrified the world and added lustre to the naval prowess of the United States. The news was at first hardly credited, for it was difficult to conceive that the Spaniards had received so much punishment at so small a cost to the victors. Not only was the Spanish fleet annihilated and the forts and batteries at Cavité destroyed, but the loss of Spanish life was heavy, the casualties being close upon five hundred in killed and wounded, exclusive of sundry prisoners. The triumph could hardly have been more complete, or the defeat more crushing. Three of the Spanish ships were sunk, including Montojo's flagship; eight were burned; while the two tugs and several launches were captured. The American loss, as stated, was only seven men injured, though the expedition suffered the loss, during the engagement, of the chief engineer (Randall) of the *McCulloch*, who, overcome by the heat of the engine-room, added to that of the tropical climate, died of an apoplectic fit; while Captain Gridley, of the *Olympia*, succumbed and had to be invalided, dying on his way home, at Kobe, Japan, on the 4th of June following. Almost miraculous were the escapes from serious casualties on Dewey's ships, especially when it is recalled that the *Olympia* was struck thirteen times, while shells exploded perilously near the other vessels of the fleet. Only the poor gunnery of the Spaniards saved the expedition from greater mishap. When official news of the victory reached Washington, the President caused Commodore Dewey to be raised to the rank of acting rear-admiral, and he and his men were thanked by Congress, while the sum of $10,000 was voted to purchase a sword for Admiral Dewey, and to decorate with medals all those who had taken part in the battle.

MANILA, ITS ASSAULT AND CAPTURE. In the absence of a land force to coöperate with the fleet in the capture and occupation of Manila, Admiral Dewey wisely refrained from bombarding the capital. Motives of humanity, moreover, held him back, since he thought that the presence of an adequate land force would compel the Spaniards to surrender rather than have the city shelled and its inhabitants cruelly driven from their homes. The task of taking the place, it was felt, would be easy enough; but at first it was feared that Spain would send another fleet to replace Montojo's, and so the demand arose for a sufficiently large land force, with a strengthening of the fleet, to enable Dewey to cope with any new expedition that Spain might send out, and to hold Manila, when captured, against the insurgents, who partly invested and menaced the town. But there was delay in getting together and despatching from San Francisco a force strong enough to accomplish the proposed undertaking. By degrees a force of volunteers, marines, and land artillery was, however, mobilized and despatched to the Philippines, under Maj.-Gen. Wesley Merritt, assisted by Brigadier-Generals McArthur and Greene. This force was duly landed, and it

entrenched itself south of Manila. By the end of July, 1898, it was augmented by the arrival of further troops, while the fleet was reinforced by the coming of the *Monterey*. The investing American troops pushed on their works until their trenches menaced the Spanish line and placed it in grave peril. Suddenly a brisk firing opened from the latter, driving in the American pickets and threatening a serious flank attack. This occurred on the night of July 31. It precipitated a hot engagement, which, after considerable loss of life on both sides, resulted in driving the Spanish back upon Malate, within three miles of the capital. A week later an attempt was made to induce the city to surrender, but this was rejected, in spite of the destitution and distress within its defenses and the hopelessness of prolonging the conflict. Stern measures were now determined upon, and the authorities were given until August 9th to capitulate or to remove all non-combatants before the place was taken by assault. The date arrived without overtures having been made to the investing force, but the assault was postponed at the solicitation of the foreign consuls, who desired to remove their respective countrymen to the neutral ships — British, French, and German — in the harbor. Such was the situation on the morning of August 13, when the American ships began to shell the fortifications, and the land force advanced upon Fort Malate and captured it. Once more an appeal was made for the surrender of the city, and after some parleying the authorities consented, and the Second Oregon regiment, accompanied by General Merritt, landed, and the latter received the city's capitulation. Over 6,000 Spanish troops laid down their arms, and the Spanish flag was replaced by the Stars and Stripes. A national salute from the American fleet, with hearty cheers from their crews, marked the surrender and the raising of the symbol of new sovereignty. Next day a proclamation announcing the establishment of a military government in Manila further signalized American occupation, and articles of capitulation were drawn up and signed. It was then discovered that the Spanish governor, General Augusti, anticipating the inevitable surrender, had deserted his post and taken refuge on a German ironclad. Meanwhile, the peace protocol between the United States and Spain had been signed, August 12, though news of it did not reach Manila until two days after the surrender.

MANIOC. See CASSAVA, Vol. V, p. 159.

MANISTEE, a city and the county seat of Manistee County, Michigan, in the northwestern part of the southern peninsula of that state. It is the seat of the largest salt industry in the west, producing more than 6,000,000 bushels a year, and also has considerable iron works and machine shops. The country adjacent is largely devoted to fruit growing. It is reached by the Flint and Pere Marquette, the Manistee and Grand Rapids and the Manistee and Northeastern railroads, and had in 1900 a population of 14,260. W.F.J.

MANISTIQUE, a village, the capital of Schoolcraft County, central northern Michigan, 42 miles E.N.E. of Escanaba, on Lake Michigan, at the mouth of the Manistique river, and on the Minneapolis, St. Paul and Sault Ste. Marie railroad. It has manufactories of lumber, sashes, doors and blinds, and pig-iron. It has fishing interests, and is a summer and sportsmen's resort. Population 1890, 2,940; 1900, 4,126.

MANITOBA, the prairie province of the Canadian dominion, in 1870 was carved out of the domain of the Hudson Bay Company, then known as Rupert's Land, and locally as the Red River Settlement. Its shape is that of a parallelogram, and its area is 73,956 square miles, nearly 10,000 of which are water. Manitoba has had a rapid growth, its population having swelled from 18,995 in 1871 and 62,260 in 1881 to 254,947 in 1901. It has a railway service 1,815 miles in extent, and the facilities of steamboat communication on the Red River. The entire province having originally been the bed of a lake, its soil is very rich and productive. The wheat grown in the province is of a high grade, and the average yield is high, except in seasons when frosts have affected either the quantity or the quality. Potatoes and other root crops yield wonderfully. The climate of Manitoba is liable to extremes of heat and cold, and this, with frosts occasionally blighting not a little of the harvest, is the drawback. The temperature ranges from 95° F. in summer to 30° and 40° below zero in winter. The mean rainfall is about 14 inches, and the mean snowfall about 45 inches. Severe as the climate is, however, it is extremely healthful and bracing.

Farming is the great industry of the province, which combines, on its vast level plains, cattle-raising with the production of cereals. Wheat and oats are the chief yield, with the addition of barley and potatoes. The area under cultivation of these crops in 1900 was: in wheat, 1,457,396 acres; in oats, 429,108 acres; in barley, 155,111 acres; and in potatoes, 16,880 acres. The yield for the same year was, in bushels: Wheat, 13,025,252; oats, 8,814,312; barley, 2,939,477; and potatoes, 3,233,298. The census returns for 1900 give the following as the total live-stock of the province: Horses, 118,629; horned cattle, 237,560; sheep, 25,816; and swine, 77,912. The increase is remarkable over the stock owned in the province in 1881, considering the, as yet, small occupied area. The cultivable area of the province and the contiguous Northwest Territories is in the neighborhood of 230,000,000 acres. Of this vast tract less than two million acres are under cultivation for wheat. The wheat-raising possibilities of these rich and extensive plains are therefore scarcely entered upon, and the same may be said of the scope and advantages of the region for the purposes of cattle-raising. The great drawback to prosperity is the want of population, a tariff that shall bear less hardly in its taxation upon agricultural implements, and freer access to the great markets of the continent. Of manufactures, Manitoba, so far, has little. In 1891 the total working capital of such establishments as she had did not exceed $2,500,000, and the value of the gross output was under $11,000,000.

Manitoba has but one legislative chamber, of

forty members, five of whom are ministers of the crown, and four under a lieutenant-governor, the cabinet, or executive council. The province is represented in the Dominion Parliament by three Senators, and seven members in the Commons. Its revenue, the chief item being the Dominion subsidy of $483,687, was, in the year 1900, $905,331, $180,000 less than the year's expenditure. The debt of the province, which was incurred mainly for railway aid and public works, was, in 1900, $8,615,863. Of the total population (254,947 in 1901), a small percentage was Indians and French-Canadian half-breeds. The total Indian population, including that of the adjacent Northwest Territories, was, in 1891, 23,708, more than half of whom have cultivated land holdings. The religious census of Manitoba in 1891 was as follows: Presbyterians, 38,977; Church of England, 30,852; Methodists, 28,210; Roman Catholics, 20,571; Baptists, 15,829; Lutherans, 6,548; and Congregationalists, 1,815.

Education in Manitoba was formerly under a board composed of two sections, one Protestant and another Roman Catholic; but by the act of 1890 this arrangement, together with the separate school system, was set aside, and a department of education established. The board consists of the provincial executive and an advisory council of seven members, four being appointed by the board of education, two by the public and high school teachers and one by the University of Manitoba. The validity of the act of 1890 has, however, been called in question and given rise to considerable litigation. The abolition of the separate or sectarian schools has been a disturbing element in the political atmosphere of the Dominion, especially outside the province, where French and Roman Catholic sticklers for separate religious schools are noisy and aggressive. The matter having been argued before the native courts, it then was referred to the Imperial Privy Council, which acknowledged the grievances of the minority in Manitoba and affirmed that the Federal Parliament had power to legislate. In March, 1895, the Dominion authorities called upon the Manitoba government to pass an act to relieve the Catholic minority; but Manitoba refused to comply with the request, insisting that the public schools of the province shall be non-sectarian, and that no religious exercises, except under certain conditions, shall be allowed therein. The controversy once more became a brand of political strife in the Canadian Parliament, and in 1896 the question was referred to the people at the polls, resulting in the overwhelming defeat of the Catholic party. The statistics of education in Manitoba for 1900 show that there are 1,352 schools in operation, with a school population of 62,664, and an average attendance of 27,870, or half the number enrolled. The number of teachers was 1,596, and the total amount raised for education $1,229,878. The Dominion government holds, in trust, for the purposes of education in Manitoba, two sections of land, 640 acres each, in every township. Some portion of these lands, which for years had purposely been kept out of the market, in order to allow their value to increase, have been sold, netting an average of $7.10 per acre.

The chief towns of the province are Winnipeg, the capital, which in 1881 had a population of 7,985, increased to 25,642 in 1891, and to 42,340 in 1901; Brandon, pop. in 1901, 5,380; and Portage la Prairie, pop. in 1901, 3,901, and St. Boniface 2,019. See also MANITOBA, Vol. XV, pp. 497–98.

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MANITOBA LAKE, a very large and irregular body of water in the province of Manitoba, Canada, lying between lat. 50° and 52° N., and between long. 98° and 100° W. It runs north-northwest, and is 120 miles long. Its greatest breadth is 30 miles, at its south end. Area, 1,900 square miles. It receives the White Mud River and the waters of Lake Winnepegosis through the Waterhen River. Its waters are discharged through St. Martin's Lake into Lake Winnipeg. Altitude 1,815 feet.

MANITOU, Colorado, a town and health resort of El Paso County, on the eastern base of Pike's Peak in the Rocky Mountains, 5 miles northwest of Colorado Springs, on the Colorado Midland and the Denver & Rio Grande railroads. The Manitou and Pike's Peak railroad by which the ascent of the mountain is made, is operated in summer only; the town is also connected, by electric trolley roads, with numerous towns and other scenic beauties in the neighborhood which include Monument Park, the Garden of the Gods, Cascade Cañon, etc. About 50,000 tourists and health seekers visit the town annually. Permanent population, 1890, 1,439; 1900, 1,303. C.L.S.

MANITOULIN ISLANDS, a name given to the line of rocky islands separating Lake Huron from Georgian Bay and North Channel, and consisting of Great Manitowan, Little Manitowan, or Cockburn Island, and Drummond Island, the first two belonging to Ontario, the last to Michigan. The first and largest is eighty miles long and twenty broad, is very irregular, with innumerable bays, lakes and streams, and clad with forests of pine, spruce and cedar. Area, 1,600 square miles. The second, Cockburn, is seven miles in diameter. The third is 10 and 18 miles in its extreme diameters, and is a summer resort. None of the islands is fertile, but all are fine fishing-grounds. The Canadian islands contain about 2,000 inhabitants, of whom more than half are Algonquin Indians. The American island had, in 1894, 408 inhabitants, of whom 257 were natives.

MANITOWOC, a city of central eastern Wisconsin. It has regular steamboat connection with Milwaukee, and Ludington, Michigan. It has tanneries and edged-tool works, and has a subscription library. It also manufactures machinery, iron, flour, bricks and glue, having the only glue factory in the state. Population 1890, 7,710; 1900. 11,786. See also MANITOWOC, Vol. XV, pp. 498–499.

MANIZALES, Colombia, an interior town in

the department of Antioquia, at the southern converging point with the boundaries of the departments of Cauca and Tolima, 100 miles west by north of Bogotá and about 150 miles east of Cape Corrientes on the Pacific Ocean. It is situated at an altitude of 7,030 feet above ocean level in the Cordillera Central between the Miel and the Cauca affluents of the Magdalena River, and is a comparatively modern commercial town in an advantageous position on the great trade route traversing the republic from north to south and connecting with the principal towns and seaports. It is the center for an extensive farming and stock-raising region, exporting chocolate-nuts. Population of town and district 15,000. C.L.S.

MANKATO, a city and railroad center of central southern Minnesota. It is situated in a flouring and lumbering district, with several beautiful lakes in the vicinity. It manufactures pumps, plows, sewer-pipe, machinery, brick and lime, cement and fiber-ware. It has three national banks, a state normal school and a board of trade. Population 1890, 8,838; 1900, 10,599. See also MANKATO, Vol. XV, p. 499.

MANLIUS, a post village of Onondaga County, central New York, about 12 miles E. of Syracuse, on the West Shore railroad. It is the seat of St. John's Military school and contains manufactories of paper, iron, flour, woolen goods and cement. Pop. (1900), 1,219.

MANN, BENJAMIN PICKMAN, scientist, was born at West Newton, Mass., on April 30, 1848, and was graduated from Harvard College in 1870. He was an entomologist, in Brazil and elsewhere, from 1870 to 1886; instructor in botany at Bowdoin College in 1877; U. S. assistant entomologist in 1881–86, and since 1887 an examiner in the U. S. Patent Office. W.F.J.

MANN, CAMERON, clergyman, was born in New York in 1851, and was graduated from Hobart College in 1870 and afterward from the General Theological Seminary of the Protestant Episcopal Church. He entered the ministry of that church in 1873, and filled pastorates in several places. In 1901 he was consecrated bishop of the diocese of North Dakota. He is the author of *Five Discourses on Future Punishment, Comments at the Cross*, and some other works in prose and verse. W.F.J.

MANNA-LICHEN. See LICHENS, Vol. XIV, p. 563.

MANNERS, JOHN JAMES ROBERT. See RUTLAND, DUKE OF, in these Supplements.

MANNESMANN TUBE. See IRON AND STEEL, in these Supplements.

MANNING, a town of Carroll County, Iowa, in the central-western part of the state. It lies in an agricultural country, and is reached by the Chicago, Milwaukee and St. Paul, the Chicago, Rock Island and Pacific, and the Chicago, Burlington and Quincy railroads. Its population in 1900 was 1,169. W.F.J.

MANNING, a town and the capital of Clarendon County, southeastern-central South Carolina, 56 miles E.S.E. of Columbia, on the Atlantic Coast Line railroad. It is in an agricultural and well-timbered region, and has turpentine distilleries and lumber-mills. Population 1900, 1,430.

MANNING, DANIEL, an American journalist and financier; born in Albany, New York, May 16, 1831. He began his career as a reporter on the Albany *Argus*. In 1865 he became associate editor and was afterward part owner of this newspaper, which under his management developed into a strong political power and was largely instrumental in breaking up the Tweed ring. He strongly supported Governor Tilden's administration. Through his membership of the New York state committee he was intimately connected with the leaders of the Democratic party. In 1880 he was chairman of the National Democratic Convention and became a prominent figure in national politics. In 1885 President Cleveland appointed him Secretary of the Treasury, the affairs of which office he conducted with marked ability. He resigned in 1887 as a result of ill health, but was connected with several commercial and banking enterprises in New York city until his death in Albany, December 24, 1887. W.M.C.

MANNING, HENRY EDWARD, CARDINAL, an English prelate; born in Totteridge, Hertford, July 15, 1808. He was educated at Harrow and Balliol College and in 1832 was ordained and appointed a curate in Sussex. In 1833 he became rector of Woollavington, and was appointed archdeacon of Chichester in 1840. In 1842 he was select preacher to the University of Oxford. He took very little part in the tractarian movement, and in 1851, after the decision in the "Gorham case," he joined the church of Rome and was ordained a priest. He founded the congregation of the Oblates of St. Charles at Bayswater, London, in 1857, and upon the death of Cardinal Wiseman was consecrated Archbishop of Westminster in 1865. In 1875 he was made a cardinal by Pius IX. Among his works are *Temporal Power of the Popes* (1860); *The Temporal Mission of the Holy Ghost* (1865); *Petri Privilegium* (1871); *The Vatican Decrees* (1875); *The Catholic Church and Modern Society* (1880); *The Eternal Priesthood* (1883); *Characteristics* (1885); *Miscellanies* (1888), and *Religio Viatoris* (1889). He died in London, January 14, 1892. W.M.C.

CARDINAL MANNING.

MANNING, THOMAS COURTLAND, an American jurist; born in Edenton, N. Car., in 1831. He was graduated from the University of North Carolina and was admitted to the bar. In 1855 he went to Alexandria, La., and there established a large practice. He was a delegate to the Secession Convention and entered the Confederate army as a lieutenant. He served as adjutant-general in

1863 and attained the rank of brigadier-general. In 1864 he was associate judge of the supreme court of Louisiana. He was a presidential elector in 1872 and 1876 and in 1877 and in 1882 he was chief justice of the State supreme court. He was appointed minister to Mexico in 1886. He died in New York city, Oct. 11, 1887. W.M.C.

MANNITE. See FERMENTATION, Vol. IX, p. 85.

MANOA. See EL DORADO, Vol. VII, p. 721.

MANOEL DO NASCIMENTO. See PORTUGAL, Vol. XIX, p. 573.

MAN-OF-WAR BIRD. See FRIGATE-BIRD, Vol. IX, p. 690.

MANSARD OR MANSART, FRANÇOIS, a French architect; born in Paris, Jan. 23, 1598. He originated the peculiar roof known by his name was first architect of the king and designed the royal buildings, built the hotels De Bouillon, Toulouse and Jars, and the gates of the churches of the Feuillants and of Les Filles Ste. Marie. He died in Paris, Sept. 23, 1666.

MANSARD, JULES HARDOUIN, a French architect, grand-nephew of François Mansard; was born in Paris, in 1646. He studied under the direction of the architect Libéral Bruant, and was made the architect of the king (Louis XIV) and director-general of the royal palaces. Some of his most important works were the château of Clugny; the enlarging of the château Saint-Germain; in connection with the palace of Versailles; the château of Marly; the Grand Trianon; the dome of the Hôtel des Invalides; the château Dampierre; the Place Vendôme. He died at Marly in 1708. See also VERSAILLES, Vol. XXIV. R.W.C.

MANSFIELD, a town of Bristol County, southeastern Massachusetts, 25 miles S.W. of Boston, on the New York, New Haven and Hartford railroad. Cutlery, baskets, gold, shell and horn jewelry, straw hats, bonnets, ranges and stoves, taps and dies, are manufactured. The town also contains foundries, spindle-works, and a public library with 3,800 volumes. Population 1890, 3,432; 1900, 4,006.

MANSFIELD, Ohio, a city and the county seat of Richland County, is a great railroad center, being reached by the Erie, the Cleveland, Cincinnati, Chicago and St. Louis, the Pennsylvania, and other roads. Its population in 1900 was 17,640. See in Vol. XV, p. 505. W.F.J.

MANSFIELD, a former borough of Allegheny County, Pennsylvania, now transformed into Carnegie Borough, but retaining the old name for its railroad station and other purposes. It is a western suburb of Pittsburg, with which it is industrially identified. It is reached by the Pittsburg, Cincinnati, Chicago and St. Louis, and the Pittsburg, Chartiers and Youghiogheny railroads. The population in 1900 was 7,330. W.F.J.

MANSFIELD, a post borough of Tioga County, central northern Pennsylvania, 40 miles N. of Williamsport, on the Tioga River, and on the New York, Lake Erie and Western railroad. It is in an agricultural region, and is the seat of a state normal school, school for soldiers' orphans, has flour, saw and planing mills, cigar, clothes-pin and mattress factories, a bedstead factory and an iron-furnace. Population 1900, 1,847.

MANSFIELD, EDWARD DEERING, journalist, was born at New Haven, Conn., on August 17, 1801, and was graduated from West Point in 1819, but declined his commission and went to Princeton, where he was graduated in 1822. He was admitted to the bar in 1825 and practiced for a time in Cincinnati, was professor of constitutional law in Cincinnati College, and then became the editor of various papers in Cincinnati. He was the author of *A Political Grammar*, *Life of General Scott*, *Legal Rights of Women*, *Utility of Mathematics*, and other works. He died on October 27, 1880. W.F.J.

MANSFIELD, JARED, an American military engineer and surveyor; born in New Haven, Conn., May 23, 1759. He was graduated from Yale College in 1777, and in 1802 entered the United States Army as captian of engineers and for six years was surveyor-general of the United States. He then became instructor in natural philosophy at the West Point Military Academy, ranking as a lieutenant-colonel. In 1824 he retired to Cincinnati, O., where he practiced surveying. He died, while on a visit to New Haven, Feb. 3, 1830. He wrote *Essays, Mathematical and Physical.* W.M.C.

MANSFIELD, JOSEPH KING FENNO, an American soldier; born in New Haven, Conn., Dec. 2, 1803. In 1823 he entered the United States army as an engineer and in the Mexican War became chief engineer under Gen. Taylor. He took part in the engagements at Monterey and Buena Vista, being promoted to the rank of colonel. In 1853 he was appointed inspector-general of the army and served until 1861, when he was made brigadier-general and given command of the Department of Washington. He was afterward in command at Hatteras and Newport News, and after capturing Norfolk was placed in command at Suffolk, Va., receiving the rank of major-general. He was in command of a division of the Army of the Potomac at Antietam and while leading his troops fell fatally wounded and died near Sharpsburg, Md., Sept. 18, 1862. W.M.C.

MANSFIELD, RICHARD, an American actor; born on the island of Heligoland, May 24, 1857. His mother was Madame Rudersdorff, a singer. He passed his early life in the United States, while his mother was filling engagements there; went with her to London and attended school studied for the East Indian civil service, but abandoned that idea for business; not succeeding, tried both literature and art, with the same result. His first public appearance was at a musical entertainment at St. George's Hall, London; soon after obtained an engagement

RICHARD MANSFIELD.

with a Gilbert and Sullivan traveling opera company to play small parts. He made a visit to America and appeared as Koko in *The Mikado*, wherein he made a decided success. He appeared in 1878 as Dromez in the comic opera of *Les Manteaux Noirs*, and when *A Parisian Romance* was produced at the Boston Museum in 1883, he showed of what artistic material he was made. His Baron Chevrial was a great creation. In 1886 he appeared as Prince Karl in the play of that name at the Madison Square Theater, New York. In *Dr. Jekyll and Mr. Hyde* he achieved a marked success, and played acceptably in this in London in 1888. His later notable *rôles* are Dimmesdale in Joseph Hatton's dramatization of *The Scarlet Letter*, Beau Brummel, Tittlebat Titmouse in *Ten Thousand a Year*, and Cyrano de Bergerac (1898).

MANSFIELD COLLEGE, a theological school, at Oxford, England, established as a training-place for men who intended entering the Nonconformist ministry, but its classes are open to the graduates of any recognized university. It has scholarships in arts and in theology, each of the value of $300 a year. A settlement in connection with the college is maintained at Canning Town East. The college buildings were opened Oct. 15, 1889.

MANSFIELD, Mount, an imposing and somewhat detached peak at the northern part of the Green Mountain range, in Lamoille and Chittenden counties, Vermont, in the central-northern part of the state. It marks the watershed between the Lamoille and Winooski or Onion rivers, and because of its altitude, its grandeur of aspect, and the extensive view obtained from its summit, is a favorite resort of artists and tourists. It is more than 4,000 feet high. W.F.J.

MANSION HOUSE. See London, Vol. XIV, p. 829; and in these Supplements.

MANSLAUGHTER. See Murder, Vol. XVII, pp. 58–59.

MANT, Richard, an eminent prelate of the English Church; born at Southampton, England, of Irish parentage, February 12, 1776. He graduated from Trinity College, Oxford, in 1797, and in 1804 was made curate of Buriton, in Hampshire. In 1810 he was appointed vicar of Coggeshall, in Essex, and in 1820 was advanced to the bishopric of Killaloe and Kilfenora, Ireland, three years later being transferred to the see of Down and Connor. He was the author of *History of the Church of Ireland from the Reformation to the Union of the Churches of England and Ireland, in 1801*, and *Commentary on the Bible*. He died at Ballymoney, Ireland, in 1848. R.W.C.

MANTES, France, a town in the Department of Seine-et-Oise, on the River Seine, 29 miles northwest of Paris. It is the Roman Medunta, and is an interesting town with mediæval buildings. William the Conqueror burned the town in 1083 and died from an injury caused by his horse swerving on hot cinders; Philip Augustus also died here in 1223. Population, 7,000. C.L.S.

MANTEUFFEL, Edwin, Baron von, a Prussian field-marshal-general; born at Dresden, Feb. 24, 1809. He entered the military service in 1827, and attained, in 1848, the rank of an aide-de-camp to King Frederic IV, in 1854 of a colonel, and in 1857 of chief of the personnel department in the war ministry, in which he helped to reorganize the army. Promoted in 1861 an adjutant-general and lieutenant-general, he took part in the Danish campaign of 1864, and was, in 1865, entrusted with the chief command of the Prussian troops in the Elbe duchies, and in September appointed administrator of Schleswig. On the summoning of the Holstein representatives by Austria, contrary to the stipulations of the Gastein convention, he, in 1866, prevented their assembling, entered Hanover, captured the fortress of Stade, and took part in the battles of Waldaschasch, Hausen, and Langensalza, and defeated the south German armies at Tauberbischofsheim, Werbach, Helmstadt, and Rossbrunn. At the head of the first army corps he, in the war of 1870–71, rendered effective service at Colomby and Noisseville, and as commander of the first army won the battles of Amiens and Hallue. Appointed commander of the army of the south, he brought succor to the troops besieging Belfort, and forced Bourbaki's army to enter Swiss territory at Pontarlier, Feb. 1, 1871. From June 20, 1870–73, he commanded the army of occupation in France, and was, in 1873, made a field-marshal-general, and in 1876 and 1870 sent on diplomatic missions. In 1879 he was appointed governor of Alsace-Lorraine, and commanding general of the fifteenth army corps. He died at Carlsbad, June 17, 1885. G.A.S.

MANTI, a city and the county seat of San Pete County, Utah, in the central part of the state. It lies among the Wasatch Mountains, 105 miles south of Salt Lake City. The country is rich in agriculture and sheep-raising, and the city is an important commercial center and also the site of a number of Mormon churches and schools, including the chief Mormon temple outside of Salt Lake City. Its population in 1900 was 2,408. W.F.J.

MANTIS–SHRIMP, a small marine crustacean of the genus *Squilla*, and order *Stomatopoda*. These crustaceans somewhat resemble the mantis insect in external appearance.

MANU or MENU. See Sanskrit, Vol. XXI, p. 302; and India, Vol. XII, p. 821, note.

*MANUAL TRAINING IN THE PUBLIC SCHOOLS. Manual training conveys to the mind such indefinite and varying meanings, and its advocates are so lacking in precision of statement concerning its purpose, that it is necessary to fix as exactly as possible what the name means to the educational mind. Industrial and manual training are used interchangeably, and manual training is frequently contrasted with the Swedish or "sloyd" system. Industrial or technical, and manual, training, from the point of view of latter-day education, mean entirely different things, suggest radically different methods, and have absolutely different ideals.

There is the greatest diversity in the use of the work *industrial*. It has been applied to reform schools, to trade schools, to charitable institutions

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where boys spend half their time at ordinary labor, earning their living or a part of it, and it has been given indiscriminately to manual-training and technical schools. As generally used, industrial training means the education of neglected children, reclaiming them from evil influences and training them to habits of industry. "Industrial schools" are really schools for the reclamation of juvenile vagrants and the neglected children of criminal parents.

In a wider sense, industrial training is used synonymously with *technical* training, which includes instruction in the arts and sciences underlying the practice of trades or professions. This training may be general as well as special instruction, applicable to certain groups of industries; or it may provide special instruction only, with or without practice, in certain handicrafts. But it is now found convenient to restrict the term "technical" to education in that special training which helps qualify a person to engage in some productive industry.

The problems of industrial and technical education, then, are social and utilitarian. But there are purely psychological and educational arguments in favor of *manual training*, which is to be regarded as having that definite social result common to all efforts to develop the higher life of mankind. The system is based, not merely upon the industrial demands of our time, but upon what should constitute an education fitted to prepare a human being for existing social conditions. The name is unfortunate and misleading. A manual-training school is neither a technical nor an industrial school. It is far too elementary to deserve the name "technical," and, on the other hand, it is too wide and free to merit the term "industrial." The object of every feature is education in a broad and high sense.

Manual training is but a single factor in the great educational product of the nineteenth century. It is a logical outcome of the thought which Pestalozzi contributed to the philosophy of teaching, and which, under Froebel, brought forth its best results in kindergarten instruction. Its well-known motto is, "Learning by doing"; not simply learning to execute a particular piece of work, but training all the faculties which come into play in the operation—observation, concentration, precision, construction—leading to mastery and power.

About twenty-five years ago Herbert Spencer declared that new conditions were forcing new methods upon us; that intellectual growth must come through the pursuit of scientific studies rather than the traditional Greek and Latin. But Spencer did not enunciate the new gospel. The departure was inevitable as soon as education became democratic. The universal education could not come through the classics, which of themselves do not appeal to the large mass of the people, being the delight of the philosopher and student, but seldom appeal to the world of action. While classic acquirements continue to attract a limited number, the majority of men will choose to derive their culture from every accident and incident of life and nature.

The methods of manual training known as the Russian and the Swedish are frequently contrasted. All methods agree in making physical exercise the basis of instruction; also in adopting the inductive method of teaching. The Swedish or "sloyd" system differs from most of them in using wood as the only material for construction, and in the form of the models. It is less technical than the systems of France and Denmark, and less theoretical than that of Germany, laying greater stress on the utility of the articles and upon introducing curved lines at an earlier stage. This system (*slöjd*) came originally from Finland, but was adopted some twenty years ago in Sweden, and there perfected in its methods. Its aim is not to teach the pupil a trade, but to educate him. Its primary object is to insure a healthy physical and mental development, while its secondary object is to secure a general dexterity useful in every vocation. The method is based upon the principle that a harmonious mental development is best secured through a harmonious physical development promoted by exercise. It proceeds first to call the physical activities into play, and by stimulating, strengthening and training these, it seeks to awaken, develop and cultivate the powers of the mind. Taking advantage of the pupil's activity, it permits him to engage in work so arranged as that he is led to discover the principle to be taught, and thus apply his knowledge in obtaining a useful training.

The method in general use in the secondary schools is known as the Russian method, because of its introduction into this country through the influences of the Russian exhibit at the Exposition of 1876. As stated by one of the leading authorities on the subject, this system of manual training is limited to teaching and learning the use of tools, the method of working materials, and the construction and use of shop-drawings—mechanical designs—where the mastery of tools, materials and methods is the immediate end in view. The instruction and practice deals with general principles, and the forms used in exercises are as typical as possible. "While in hand they are particular, definite and precise, because every concrete exercise must be particular, however general may be the application of the ideas involved" (Woodward). The same authority declares that "in any fundamental process . . . the judicious teacher places great emphasis upon this mastery of tools."

The whole manual-training movement is now in its formative period, and the time is a critical one. There will, very naturally, flow from the different methods in use a distinctive system embracing the best features of all. There is nothing at bottom antagonistic in the Russian and Swedish methods, the principles and aims of both being really the same. Whatever differences there may be in methods arise more from historical accidents than from pedagogical principles. At present the Swedish system is found to be more practicable in elementary schools and with the younger children, while the Russian system in high-schools gives opportunity for that more vigorous exercise which older boys naturally crave. Where the question arises of providing this training for girls in high-schools, the Swedish comes nearer the ideal than the Russian

system. It is to be regretted that manual training for girls has yet to receive important consideration.

But aside from the method of manual training, the spirit of that training is of paramount moment to the educator. Two rival theories contend for the mastery of its future. The one regards manual training as an end in itself, and subordinates education to technical skill. The school is heralded as the legitimate successor of the apprentice system, and as an institution whose highest end is to restore the advantages lost in the abolition of that system. According to this theory, the ability to *do* becomes the standard of success for the school, and the chief object of its ambition the production of well-executed handiwork.

The other theory also sees in the school an establishment for the manufacture of a definite product; but it is a product too subtile to find its expression in wood or iron or clay. In this view the school is a purely educational institution, and is industrial only in making use of the tools of industry to accomplish its chosen purpose. The manual work, like the work in science and literature, is simply a means of development.

The antagonism of these two theories is apparent, and in nearly all manual-training schools the two may be found in conflict. In one way this is an advantage, for the methods act as a check upon each other. The practical side is kept from becoming sordid, the spiritual side from being visionary. But the balance of power between the two is of the utmost importance, for it determines the character of the school.

The history of manual training in the public schools of the United States is by no means extensive. The St. Louis school was organized under the charter of Washington University, in the year 1879. As established, this school was the outcome of efforts to supply the polytechnic students of the university with the necessary preliminary training. Its development into a high-school system for general purposes was the result of the experience obtained in that preparatory work, and a new type of school was originated, examples of which now exist in a score or more cities. The Chicago school resembles the St. Louis school in most particulars, but not being related as a preparatory school to a higher institution, it has embodied more distinctly the idea of the high-school principle. This school is supported by private endowment, and is attended by boys who have successfully passed through the ordinary grammar-school course. The Toledo and Cleveland (1885) manual-training schools differ from the foregoing. In these cities the manual-training schools are not complete and independent schools, but are annexed to public high-schools, and are supported by private endowments. The Toledo school is open to girls as well as boys, and sewing, cooking and dress-making, with drawing, wood-carving and light joinery, together with the ordinary shop-work, are included in the course of study. Baltimore (1884) and Philadelphia (1885) each organized complete and independent schools under the direct control of their respective boards of education. These schools were the first manual-training schools established in the United States as part of a municipal system of education, and the requirements for admission render them true high-schools in their relations with other parts of the public-school system. With this departure a new stage in the growth of the system was attained. The establishment of the Mechanic Arts High School in Boston assures permanency of this new educational element in the public secondary schools. The development of these schools was illustrated at the Columbian Exhibition, Chicago, 1893.

At present, in the greater number of cities the manual-training schools are attended by the pupils of the higher grades of the grammar-schools. In Toledo, boys and girls attend from the senior classes; in Baltimore, boys from the two upper grades are admitted, although in general the work is not yet organized so thoroughly as in Philadelphia and Boston. Experience has shown that city-bred boys under the age of 14 seldom undertake the regular shop-instruction with satisfactory results. If such boys are admitted, lighter kinds of work must be provided for them. This means that sloyd in the elementary schools offers the opportunity for attaining the results aimed at in the secondary schools. Although the efforts are isolated, there has been an unquestioned advance in this direction. One of the most interesting steps taken was the establishment in Philadelphia of the James Forten Elementary Manual Training School. The principle of the work of the kindergarten continues through the "primary" grades, and it is hoped to develop an elementary school which will be completely organized on the modern plan. This school, above mentioned, is in the least prosperous portion of the city, and has grown from an attendance of fifty to one of over four hundred. The majority of the pupils are of Russian parentage, and many upon entering have no knowledge of the English language. At the outset a visitor had to be employed to secure the attendance of the children, but to-day the interest is so great that the regular visitation has practically ceased.

It is too early to speak with any degree of certainty as to the educational results of manual training in the public schools. A system barely ten years in use, at first bitterly opposed by nearly all professional educators, and now only grudgingly admitted to the traditional curriculum, can hardly do more to justify the hopes of its advocates. In Philadelphia nearly seven hundred boys attend two schools, and the time is not far distant when a third will be organized. Not only have the opportunities for higher education been multiplied, but the youths attracted to the manual-training schools are retained there. It has been observed that during the first or freshman year of an ordinary high-school the percentage of loss is very great. The latest report of the Central High School of Philadelphia shows 491 students in the lowest class as against 210 in the next higher class; while a recent report of the high-school of Cincinnati says the greatest drop in numbers occurs in the lowest class. This seems to be true of the Boston high-school. The latest report shows this record:

	First Year.	Second Year.
English high-school	381	169
Girls' high-school	371	193
Roxbury high-school	243	123

When comparison is made of graduating classes with the number entering from grammar-schools, the contrast is still more significant. The figures for Philadelphia show that but 18 per cent of those entering the Central High School graduate.

Boston's high-schools graduate from 15 to 20 per cent, Brooklyn about 15 per cent, and Cincinnati 10 per cent. As to the influence of manual training upon this tendency to drop by the way, one hesitates to speak too decisively. But Superintendent Seaver, in a report made in 1890, says of the boys of the Toledo school that "the tendency to drop out has been decidedly checked." The records of the Philadelphia schools give instructive results. The Central Manual Training School every year admits classes of from 130 to 150 boys. Of these, there graduated 68 in 1891, 70 in 1893, 76 in 1894, 76 in 1895.

The class of '95 numbered 150; of these, 90 remained the three years of the course, 82 graduated and 32 entered the University of Pennsylvania. The history of the North East School tells a similar story; and wherever introduced into elementary school-work, we are impressed with the fact that the tendency to leave has been checked. What further effect manual training may have remains to be seen. But the theory that a great falling-off in attendance upon school is due to economic causes receives little support from the returns of Chicago's compulsory-education authorities, who report in 1890 that of 7,664 children out of school, 1,540 were at work, while 3,528 were absent from indifference.

Another noteworthy fact is the large number of graduates of manual-training schools who enter colleges and universities. The stimulus to professional, scientific and technical work which these schools have given is an important step in the closer relations of secondary with higher education. The reorganization of our elementary curricula upon a basis recognizing the value of the principle in the different methods of manual training, will in time result in a system of general education from which our social organization will profit. The road from the kindergarten to the university will then be clear and definite.

Mary E. Mumford.

MANUEL, Juan. See Spain, Vol. XXII, p. 368.

MANUSCRIPTS. See Palæography, Vol. XVIII, pp. 149–170.

MANX LANGUAGE. See Man, Isle of, Vol. XV, p. 460.

MANZANILLO, Cuba, a seaport town with a good harbor on the east side of the Gulf of Guacanayabo, on the south coast, 84 miles west by north of Santiago de Cuba. It has an active shipping trade in the products of the region. Population, 34,000. C. L. S.

MANZANILLO, a port of Mexico. See Colima, Vol. VI, p. 127.

MAORIS. See New Zealand, Vol. XVII, p. 483.

MAPLESON, James Henry, an English operatic manager; born in 1832; died in 1901. He studied at the Royal Academy of Music; spent some years in voice-culture, when an operation for an affection of the throat made impossible his intended career as a vocalist; in 1856 became business agent and manager of traveling companies; was assistant of E. T. Smith, and in 1861 his successor, in managing Italian opera. He opened at the Lyceum in 1861, and afterward became lessee of Her Majesty's Theatre, London. In 1861 Adelina Patti appeared under his management. He afforded the public first productions of many great operas, and had under his management many of the greatest operatic artists of his time. His company traveled in the United States in the intervals of the London season after 1878. He published *Mapleson Memoirs* (1888).

MAPLESON, Marie-Roze Ponsin, a French singer; born in Paris, March 2, 1846. She studied at the Conservatoire, and made her *début* as Marie, in the opera of the same name, in 1865; sang in various operas in Paris until the outbreak of the Franco-Prussian War, when she joined the ambulance department. From 1872 to 1877 she sang successfully in England; visited the United States in 1877, returning to England the next year. She was married, first to Julius Perkins, and, after his death in 1875, to James Henry Mapleson. Her best parts include Marguerite in *Faust;* Berengario in *Il Talismano;* Leonora, Mignon and Carmen.

MAPLE–SUGAR, a sugar made from the sap of the sugar-maple (*Acer saccharinum*, also known as *A. barbatum*). The sap is nearly pure sugar and water, with a slight admixture of organic compounds, malic acid, etc., which give it the peculiar flavor so much prized. It is worth more than double the price of cane-sugar, and never is refined. The proportion of sucrose in the sap varies from 1.95 to 5 per cent, the average being about 3 per cent. The average amount of sap required for a pound of sugar is about 16 quarts. Vermont produces not only the largest quantity but the best quality of maple-sugar. In 1889 the total product was 32,952,927 pounds, a decrease of 3,623,134 pounds from the report of 1879. In 1849 the total amount produced was 40,120,209 pounds. Of the amount produced in 1889, Vermont made 42.86 per cent; New York, 31.82 per cent; New Hampshire, Pennsylvania, Michigan and Ohio together, 21.22 per cent. Eighteen other states reporting to the Census Bureau produced together but 4.1 per cent of the total. Vermont was the only state that showed an increased production during the decade ending in 1889. See Sugar, Vol. XXII, p. 661.

MAQUET, Auguste, a French novelist and dramatist; born in Paris, September 13, 1813. He was graduated from the Collège Charlemagne in 1830 and in the following year was appointed a tutor there. He then became secretary to a literary club, and became a collaborator of the elder Dumas, assisting him in the writing of his most famous novels. Under his own name he wrote and dramatized *La Belle Gabrielle* (1853); *La Maison du Baigneur* (1856), and *La Rose*

Blanche (1859). He died near Paris, January 8, 1888. W.M.C.

MAQUOKETA, a city and the county seat of Jackson County, Iowa, in the eastern part of the state. It lies at the great forks of the Maquoketa River, thirty miles south of Dubuque, and is reached by the Chicago and Northwestern and the Chicago, Milwaukee and St. Paul railroads. Its industries are agricultural, stock-raising and lumber, and it had in 1900 a population of 3,777. W.F.J.

MARABOU STORK. See JABIRU, Vol. XIII, p. 539.

MARACAYBO OR MARACAIBO, GULF OF, a wide inlet of the Caribbean Sea, extending southward into the coast of western Venezuela, between the peninsulas of Paraguana and Guajira, to the strait by which it is connected with Maracaybo Lake. The gulf and lake were discovered in 1499 by Rodrigo de Bastidas and Juan de la Casa, who found here houses built on piles, and called the district Venezuela ("Little Venice"), which afterward was extended to the entire country.—MARACAYBO LAKE is a large body of water extending southward from the gulf, and occupying a large basin formed by the Sierra de Perija and the Cordillera des Merida, 102 miles long and 59 miles wide, except at the southern extremity, where it is 75 miles. It is connected with the gulf by a neck 34 miles long and 9 wide. Ships of over 10 feet draft, however, cannot enter the lake, on account of shifting sand-bars. The water is brackish and the tide has little effect on it. The banks of the lake are low, and in the southern part unhealthful. Area, 8,392 square miles; depth, 500 feet.

MARACAIBO, Venezuelan seaport. Pop. 35,000.

MARAJO, an island of Brazil, situated between the estuaries of the Amazon and the Para, with an area of nearly 18,000 square miles. It is for the most part low and covered with grass and bush, but in the east and south with dense forest. The soil is fertile, and large herds of cattle are reared in the northeast.

MARANHAO, a state of northern Brazil, and its capital. See MARANHAO, Vol. XV, p. 533; and BRAZIL, Vol. IV, pp. 210–212, et seq.

MARAÑON. See AMAZON, Vol. I, p. 575.

MARASCHINO. See CHERRY, Vol. V, p. 509.

MARASMUS (decay, wasting away), a synonym for the general wasting of the body. The symptoms are loss of flesh and fat, loss of color, loss of strength, and sometimes degeneration of tissues. There is often a deficiency of blood, in quantity, or of its constituents. The causes are unsuitable or insufficient food; derangements of the digestive organs and lymphatic glands, want of light, air and exercise; the presence in the body of morbid agents, as malaria, tubercles, cancer, syphilitic poison, etc.; loss of blood from chronic suppuration, repeated hemorrhages and other causes. Marasmus is common at all periods of life. In infants it is due chiefly to bad feeding, and catarrhal affections of the digestive organs. After the age of three years tubercular enlargement of the mesenteric glands are not infrequent, interfering with the passage of elaborated food to the blood. After the sixth year there may be tuberculosis of the lungs, disease of the kidneys, etc. In the adult the cause is almost always some organic disease, which deranges nutrition or the elimination of waste products from the body. As marasmus is not a specific disease, but a condition due to diseases often obscure, its treatment should in every case be prescribed by a physician.

MARATHON, a post village of Cortland County, south central New York, 50 miles S. of Syracuse, on the Tioughnioga River, and on the Delaware, Lackawanna and Western railroad. It is a shipping-point for butter, cheese and live-stock. Carriages and cheese-boxes are manufactured and hides tanned. Population 1890, 1,198; 1900, 1,092.

MARATTA, CARLO, an Italian artist; born in Camerino, May 13, 1625. His cleverness as a painter was early discovered, and he was sent to Rome, where he became the favorite pupil of Andrea Sacchi, and soon acquired celebrity by the grace and beauty of his figures. He was knighted and received a pension from Clement XI, and was appointed painter in ordinary to Louis XIV. Among his works were *Constantine Destroying the Idols; Daphne; The Death of St. Francis Xavier; The Visitation*, and many other pieces founded on long study of the old masters. He was regarded as the last painter of the Roman school. He died in Rome, Italy, December 15, 1713. W.M.C.

MARBLEHEAD, a town of Essex County, Massachusetts, in the northeastern part of the state. It is on the Atlantic coast, adjoining Salem and fifteen miles from Boston, is reached by the Boston and Maine railroad, and is the chief yachting center of the New England coast, and after Gloucester the chief fishing port. Its population in 1900 was 7,582. See also in Vol. XV, page 537. W.F.J.

MARBURG, CONFERENCE OF. See LUTHER, Vol. XV, p. 83.

MARCEAU, FRANÇOIS SEVERIN DESGRAVIERS, a French general; born in Chartres, March 1, 1769. On the outbreak of the revolution he was appointed inspector of the National Guard in his native town, and in 1792 helped to defend Verdun with a body of volunteers till its surrender. Sent to join the Republican army in La Vendée, he was promoted to the rank of general of division. He commanded the right wing at Fleurus, and after the allies retreated, occupied Coblentz. During the campaign of 1796 he was given command of the first division of Jourdan's army, and sat down to invest Mainz, Mannheim and Coblentz. But whilst covering the retreat of the French at Altenkirchen he was shot, on the 19th of September, and died four days later. His body was buried in the intrenched camp at Coblentz, but was transferred to the Panthéon in Paris in 1889.

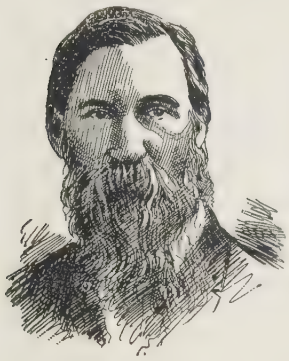
MARCELINE, a town of Linn County, northern central Missouri, 33 miles E. of Chillicothe, on the Atchison, Topeka and Santa Fé railroad. Coal, limestone, granite, fire-clay and brick-clay are found

in the vicinity in large quantities. Population 1890, 1,977; 1900, 2,638.

MARCH, river. See MORAVIA, Vol. XVI, p. 836.

MARCH, AUZIAS. See SPAIN, Vol. XXII, p. 377.

MARCH, FRANCIS ANDREW, an American author and philologist; born in Millbury, Mass., Oct. 25, 1825. He was graduated from Amherst in 1845, studied law in New York in 1849, was admitted to the bar in 1850, in 1856 became adjunct-professor of belles-lettres and English literature in Lafayette College, Easton, Pa., and in 1857 professor at the same institution of the English language and comparative philology. In 1873–95 he was president of the American Philological Association, of the Spelling Reform Association, and in 1891–3 of the Modern Language Association. He was among the earliest advocates of an historical study of the English language. In 1896 he received the honorary degree of Litt. D. at Cambridge and D.D.L. at Oxford and was made vice-president of the Shakespeare Society. His contributions to the transactions and proceedings of the American Philological Association and other learned societies have given him a world-wide fame. He edited the Douglass series of *Christian Greek and Latin Classics* (1874–76); was director of the American readers for the *Great Historical Dictionary* of English of the London Philological Society and published *A Method of Philological Study of the English Language* (1865); *Parser and Analyzer for Beginners* (1869); *Anglo-Saxon Grammar* (1870); *Anglo-Saxon Reader* (1870); *Introduction to Anglo-Saxon* (1871); *Thesaurus* (1904). W.M.C.



PROF. F. A. MARCH.

MARCHAND, MAJOR JEAN, French officer and explorer; was born at Thoissey, France, Nov. 22, 1863. He entered the army in 1883 and was for a time at the military school at St. Maixent. In 1889–91 he took part in expeditions in West Africa and the Niger district, and from 1893 to 1895 proceeded inland on an exploratory tour from the Ivory coast. In 1897 he set out on his notable expedition across the African Continent from the coast of the French Congo to the Upper Nile. This expedition met with great difficulties in transporting boats over water-sheds and from the hostility of the natives. In July, 1898, he reached Fashoda, the occupation of which by him and his following resulted in international complications with England. These were afterwards amicably settled and Marchand returned to France to be ostentatiously honored and rewarded.

MARCONI, WILLIAM, electrical engineer and inventor of wireless telegraph, is of Italian origin, having been born at Marzabotto, Italy, in 1875. His mother, however, is of English birth. Marconi was educated in Italy, but in 1896 he came to England to consult the engineer-in-chief of the British postoffice (Mr. W. H. Preece, C. B.), and to test an apparatus he had devised for transmitting signals and messages without wire. The test was favorable, as were subsequent ones in Italy as well as in England and Ireland, in communicating with ships and lighthouses, and in reporting the progress of yacht races at sea. Signor Marconi, with the help of a transmitter, a receiver, an ordinary Morse tapping machine, and two batteries attached to a width of wire-netting at the top of an improvised mast has succeeded in signalling to a distance of over 10 miles. On land, Marconi, with a permanent installation, has succeeded in communicating over great distances. He has not only sent wireless messages between Bournemouth and the Isle of Wight but even across the Atlantic. The value of wireless telegraphy in transmitting messages at sea in foggy weather, besides its other manifest advantages, favors its use by the commercial marine.

MARCHING. See WAR, Vol. XXIV, pp. 383, 384.

MARCOMANNI. See GERMANY, Vol. X, pp. 427, 429, 430.

MARCO POLO. See POLO, Vol. XIX, pp. 417, 423.

MARCOU, JULES, geologist, was born at Salins, France, on April 20, 1824, was educated at the College of St. Louis, Paris, was an instructor at the Sorbonne, and went to assist Thurmann in surveying the Jura Alps. There he met Agassiz, who invited him to come to America, and with whom he was associated in much work here. He surveyed the Lake Superior region, New Jersey, Pennsylvania, Virginia, the Mammoth Cave, and Canada. In 1853 he entered the service of the United States government, was the first geologist to cross the continent. He was professor of geology in the polytechnic school at Zurich, Switzerland, in 1855–59, but was again in the United States in 1861, in charge of the palæontological department of the Museum of Comparative Zoölogy, at Cambridge. In 1864 he re-entered the service of the United States government. His published works included a *Geological Map of the United States and Canada*, *Geology of North America*, *Geological Map of the World*, *Origin of the Name America*, *First Discoveries of California*, and a *Catalogue of Geological Maps of America*. He died at Cambridge, Mass., on April 17, 1898.

W.F.J.

MARCY, MOUNT. See *Mountains*, under NEW YORK, Vol. XVII, p. 462.

MARCY, ERASTUS EDGERTON, physician, brother of Randolph Barnes Marcy (q. v.), was born at Greenwich, Mass., on April 9, 1815, and was educated at Amherst College and the Jefferson Medical College in Philadelphia. He became one of the foremost homeopathic physicians of America, practicing at Hartford, Conn., and in New York City. He was the author of several books on the theory and practice of medicine,

and especially of homeopathy. He died on December 28, 1900. W.F.J.

MARCY, Henry Orlando, physician; born in Otis, Mass., June 23, 1837; was graduated at the medical department of Harvard University in 1863; was commissioned an assistant surgeon in the army, and was promoted medical director of the southern department. After the Civil War he began the practice of medicine in Cambridge, Mass. Later he became largely instrumental in the introduction of the antiseptic method of wound treatment. His publications include *The Perineum, Its Anatomy and Surgical Treatment; The Radical Cure of Hernia*, etc. G.J.H.

MARCY, Randolph Barnes, soldier; was born at Greenwich, Mass., on April 9, 1812, was graduated at West Point in 1832, and served in the Black Hawk War and in the Mexican War. In the Civil War he was chief of staff to General McClellan, his son-in-law, and was made inspector-general, with the rank of brigadier-general. He was retired for age in 1881. He was the author of a number of books, including *Exploration of the Red River; The Prarie Traveller; Thirty Years of Army Life on the Border*, and *Border Reminiscences*. He died at Orange, N. J., on November 22, 1887. W.F.J.

MARCY, William Learned, an American statesman; born in Sturbridge, Worcester County, Massachusetts, December 12, 1786. He was graduated from Brown University in 1808. He shortly afterward took up his residence in Troy, New York, and there commenced the practice of law. In the War of 1812 he volunteered as a lieutenant, saw active service, and led an attack resulting in the capture of a Canadian post at Saint Regis. In 1816 he was appointed city recorder of Troy. In 1821 he became adjutant-general of the state and comptroller in 1823. In 1829 he was appointed one of the associate justices of the supreme court, but he resigned that office on his election to the United States Senate in 1831. He remained in the Senate about two years; and, having in the meantime, been elected governor of the state of New York. He was twice re-elected governor, but on a fourth nomination in 1838 he was defeated. He was tendered the place of Secretary of War in the Cabinet of President Polk, which he accepted. From 1853 to 1857 he was Secretary of State under President Pierce. He died in Ballston Spa, New York, July 4, 1857. W.M.C.

MARDI GRAS, a form of carnival. See New Orleans, Vol. XVII, p. 415.

MARDONIUS. See Persia, Vol. XVIII, 584.

MARE ISLAND, an island in San Pablo Bay, north of San Francisco Bay, Solano County, California, occupied by a United States navy yard, with dry-docks, naval arsenal, and other appurtenances. W.F.J.

MAREMMA, La, a marshy region of central Italy along the south of Tuscany from Piombino southeast for more than sixty miles to Orbetallo, and fifteen to twenty miles inland, mainly within the province of Grosseto and partly in that of Pisa. The principal marsh is that of Castiglione della Pescaja, along the banks of the Bruna, formerly about ten thousand acres in extent, but being gradually converted by suitable drainage-works into fertile fields. The whole region was once the seat of flourishing Etruscan cities, but now for the most part is deserted on account of the pestilential vapors that emanate from the stagnant pools. See also Borax, Vol. IV, p. 45.

MARENGO, a city of McHenry County, Illinois, in the northeastern part of the state. It lies on a branch of the Kishwaukee River, 55 miles northwest of Chicago, in a dairying and fruit-raising country, and has extensive manufactures. It is reached by the Chicago and Northwestern railroad, and had in 1900 a population of 2,005. W.F.J.

MARENGO, a manufacturing city and the capital of Iowa County, southeastern Iowa, 27 miles S.W. of Cedar Rapids, on the Chicago, Rock Island and Pacific railroad. It is well situated in the midst of an excellent farming and grazing region. Population, 1890, 1,710; 1900, 2,007.

MARENGO, Battle of. See Napoleon, Vol. XVII, p. 211.

MARENHOLZ-BÜLOW. See Froebel, Vol. IX, p. 698.

MAREOTIS LAKE. See Egypt, Vol. VII, p. 614.

MARET, Hughes Bernard, statesman; born in Dijon, France, in 1763. Elected to the States General in 1789, he took an active part in making the constitution. He became intimate with Napoleon and was appointed by him successively secretary of the consuls, secretary of state, and chief of the cabinet. He was made Duke of Bassano by the Emperor in 1809, and in 1811 negotiated an alliance between France, Prussia, and Austria. He was made a peer by Louis Philippe in 1831, and died in Paris in 1839. G.J.H.

MAREY, Etienne Jules, a French physiologist; born in Beaune, Côte-d'Or, in 1830. He studied medicine in Paris, obtaining his degree in 1859. In 1867 he was made professor of natural history in the Collège de France. Dr. Marey invented several instruments for recording the movements of the heart, lungs, arteries, muscles and other parts of the human body, and made many experiments with them. He became an officer of the Legion of Honor in 1882. He published *Physiologie Médicale de la Circulation du Sang; Du Mouvement dans les Fonctions de la Vie; La Machine Animale*, of which an English translation appeared in New York in 1874, under the title *Animal Mechanism; Physiologie Expérimentale* (1875); *La Méthode Graphique dans les Sciences Expérimentales* (1878), and *Le Vol des Oiseaux* (1890).

MARGARET OF DENMARK. See Denmark, Vol. VII, pp. 74, 75.

MARGARET SIDNEY, pseudonym of Lothrop, Harriet Mulford, q.v., in these Supplements.

MARGARIC ACID, a mixture of stearic and palmitic acids, formerly supposed to be distinct chemical individuals, obtained by treating fats with dilute acids. Margarin was the compound of the supposed acid, and was the constituent of the fat which yielded the acid by the above treatment.

It is a mixture of tristearate and tripalmitate of glycerin.

MARGARITONE. See SCHOOLS OF PAINTING, Vol. XXI, p. 462, note.

MARHEINEKE, PHILIPP CONRAD, a German theologian; born in Hildersheim, May 1, 1780. He was graduated from the University of Göttingen in 1801 and became an instructor there in 1803. Two years later he was appointed clergyman and professor of theology at Erlangen. He then was theological professor at Heidelberg and later at the University of Berlin. He was a disciple of Hegel and wrote largely upon philosophical subjects. He died in Berlin, May 31, 1846. W.M.C.

MARIA CHRISTINA, Queen-regent of Spain; born in Austria, July 21, 1858. Her father was Archduke Karl Ferdinand of Austria. She was married in 1879 to Alfonso XII of Spain at whose death in 1885, she was appointed queen-regent. On May 17, 1902, she resigned in favor of her son, Alfonso XIII. W.M.C.

MARIA CRISTINA, Queen of Spain, 4th wife of Ferdinand VII; born at Naples, April 27, 1806, the second daughter of King Francis I of Naples. Died at Ste. Adresse, near Havre, Aug. 22, 1878. See SPAIN, Vol. XXII, p. 359.

MARIANNA, a village and the capital of Lee County, northeastern Arkansas, 45 miles W. of Memphis, Tennessee, on the St. Louis, Iron Mountain and Southern railroad. It is in a cotton and corn growing region, is an important trade and shipping-center, and has several gins. Population 1890, 1,126; 1900, 1,707.

MARIANNE ISLANDS, same as LADRONES, Vol. XIV, p. 200.

MARICOPA INDIANS, a branch of the Yuman stock. They formerly were distributed over southwestern Arizona and southeastern California, and for mutual protection were united with the Piman Indians, often intermarrying with them but preserving their own language and customs. They are an agricultural tribe, raising principally wheat on irrigated lands, and number between 300 and 400. They live on a reservation along the Gila and Salado rivers in Arizona.

MARIE DE MEDICI. See FRANCE, Vol. IX, p. 498.

MARIE GALANTE, an island. See GUADELOUPE, Vol. XI, pp. 203, 204.

MARIE LOUISE, a French empress. See NAPOLEON, Vol. XVII, pp. 222, 228.

MARIENWERDER, Germany, a city, capital of a circle of West Prussia, 45 miles by rail S.E. of Dantzic, on the Little Nogat, an affluent of the Vistula. It was founded in the 13th century as an Episcopal see, and has a fine cathedral and a castle of that period. Population, 9,000. C.L.S.

MARIÉTON, PAUL, a French poet and essayist; born in Lyons, October 14, 1862. He wrote verses as a mere youth and after an academic education in his native city, he engaged in literature, joining the Provençal school. He became chancellor of the Society of Félibrige in 1889 and two years later was elected majoral of the Society for Provence. He has written four volumes of verse, and various other works, including *Bonaparte Wyse* (1882); *Auguste Fouries* (1883), and *La Terre Provencale* (1890). He is best known by his love poems and ballads. W.M.C.

MARIETTA, a prosperous manufacturing city and the capital of Cobb County, northwestern Georgia, 17 miles N.W. of Atlanta; on the Marietta and North Georgia and the Western and Atlantic railroads. It is the seat of several educational institutions, and has marble-mills, paper-mills, chair factories and iron-foundries. Kenesaw Mountain is about two miles distant. Population 1890, 3,384; 1900, 4,446.

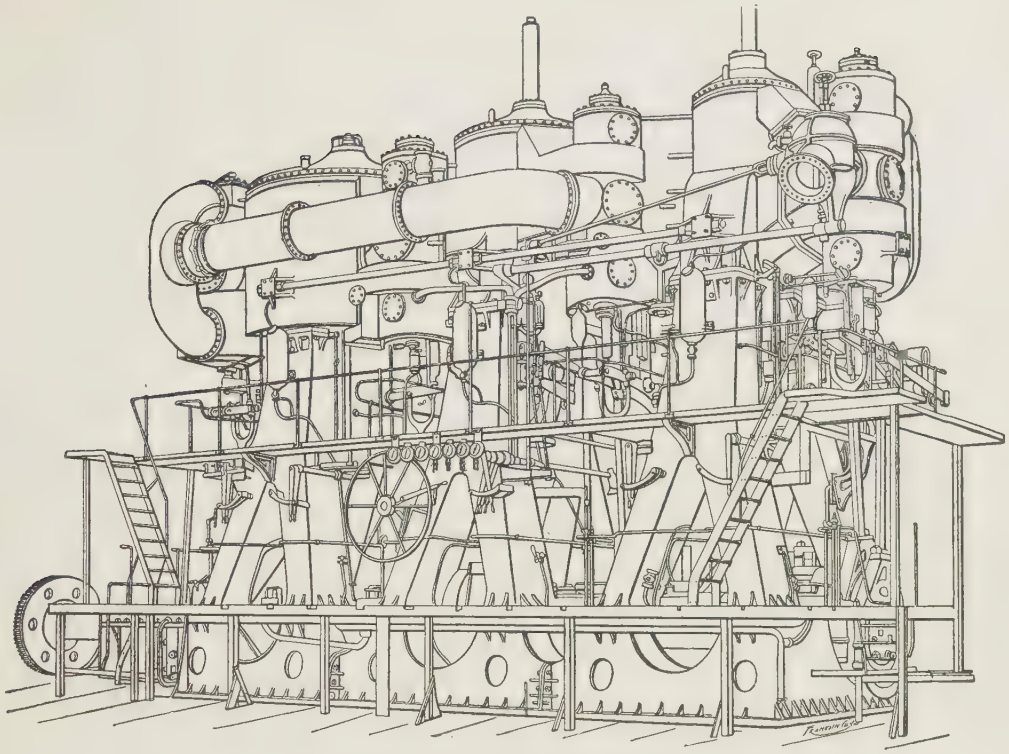
MARIETTA, a city of southeastern Ohio. Marietta is noted for the excellence of its public schools. Marietta College, situated here, had, in 1901, 21 instructors, 300 students, and a library of 60,000 volumes. Population 1890, 8,273; 1900, 13,348. See MARIETTA, Vol. XV, p. 549.

MARIETTA, Pennsylvania, a borough of Lancaster County, on the east bank of the Susquehanna River, and on a division of the Pennsylvania railroad, 27 miles southeast of Harrisburg. It is a busy commercial center with lumber industries; its manufactures include agricultural implements, furniture, silk, etc., and among its agricultural interests are vaccine farms. Population, 1890, 2,402; 1901, 2,469. C.L.S.

MARINE CITY, a city of St. Clair County, easternmost Michigan, seven miles below St. Clair, on St. Clair River. Salt is found here, and ship-building, lumbering and the manufacture of wooden articles are important industries of the town. Population 1890, 3,268; 1900, 3,829.

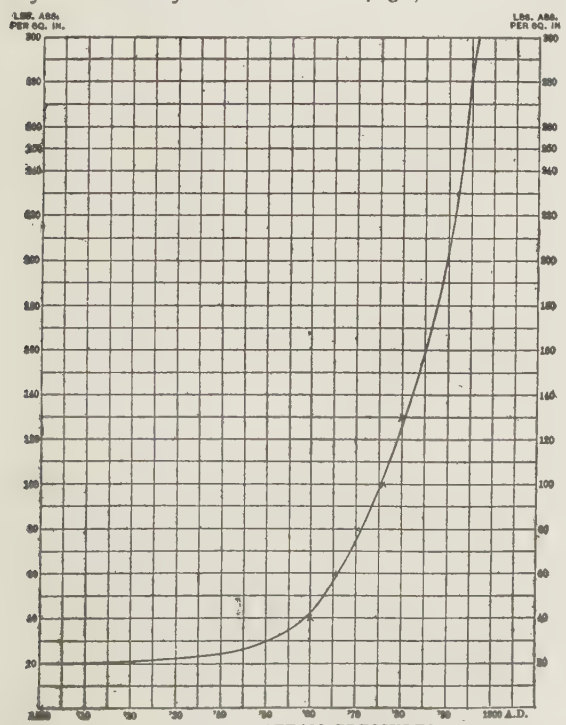
MARINE ENGINES. The marine engine of the multiple-cylinder, surface-condensing, high-pressure type, has now become standard, and is employed almost universally for sea and river vessels, in which the screw is the propelling instrument, and often, also, in the case of paddle-steamers, as, for example, on Long Island Sound. The higher types of multiple-expansion and multiple-cylinder engines, the triple-expansion and the quadruple-expansion, are recognized everywhere now as illustrating good practice. The former is employed very extensively at sea, and especially for long voyages, and the latter is considered, for exceptionally long cruises at steady speed, desirable, whenever fuel, as is usual in such cases as the latter, is particularly costly, either in price or in transportation. Pressures have continually risen since the introduction, about 1860, of surface-condensation at sea, and as rapidly as builders and users could accommodate themselves to the change and insure safety and certainty in operation of the newer types of engine and their boilers. The accompanying diagram shows the rate in the past and the promise of further increase in the immediate future.* The indications are, that early in the twentieth century, steam can safely be handled at from 300 to 400 pounds per

* *Manual of the Steam Engine;* Thurston; Vol. I, p. 354.



TRIPLE EXPANSION MARINE ENGINE.

square inch, and a generation later we may probably see in common use the pressures experimentally attained by Perkins in 1824–36, who succeed-



INCREASE OF STEAM PRESSURES.

ed in controlling 500, then 1,000 and finally 1,500 and 2,000 pounds per square inch. The sharp bend in the curve, at 1850–60, indicates the period of transition alluded to above.

The triple-expansion engine usually consists, as a whole, of three similar simple engines side by side, so arranged as to size of cylinder and disposition of pipes and valves that they work as a series.

There are, however, a number of successful arrangements of three and of four cylinder engines driving but two cranks in which the "tandem" disposition of cylinders is adopted with good results.

The engraving represents one set of the triple-expansion engines of the twin-screw sister-ships the *Paris* and the *New York*. Each set drives one screw. The magnitude of these great engines is indicated by the altitude of the working-platforms and the reversing-wheel. This may be taken to represent a standard and very satisfactory disposition of parts and general proportion of engines.

The proportions of these engines are as follow:*

Steam-cylinders, diameter, inches	45, 71, 113
Stroke of pistons, feet	5
Ratios of volumes	1, 2.489; 6.304 or 0.402; 1; 2.53
Steam-pressure, per gauge, lbs	148
Revolutions per minute	87
Vacuum, inches	26
Mean pressures, lbs	64, 32, 14
Indicated power, H. P.	19,175
Temperature feed-water, F.	119°
Temperature sea-water	54°
Area H. S., square feet	50,250
Area G. S., square feet	1,294
Area condensing surface	33,000
I. H. P. per square foot G. S.	14.8
I. H. P. per square foot H. S.	$\frac{1}{2.63} = 0.38$

**Manual of the Steam Engine;* Thurston; Vol. I, p. 221.

I. H. P. per square foot condensing surface---$\frac{1}{1.72}$ =	0.58
Ratio H. S. to G. S. ----------	38.8
Ratio H. S. to C. S. ----------	1.52

These figures for power are given by the engineer officers of the ship for passage across the Atlantic made in 5 days, 19 hours, 34 minutes.

General experience, in brief, indicates the marine compound engine, as customarily employed, to exhibit an increase in economy over the simple engine which it displaced of about 30 per cent, and a superiority of the triple-expansion engine, with steam at 140 to 160 pounds, over the compound at 90 to 100, of 20 or 25 per cent, while the latter has not been found to show much advantage with increasing pressures. Similarly, the quadruple-expansion engine exhibits superiority, though in less degree, at 200 to 225 pounds over the triple-expansion.

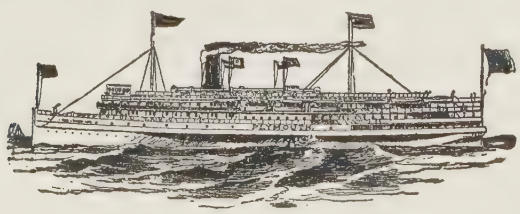
The three-crank engine also is found to possess advantages over the two-crank in efficiency of mechanism and smoothness of operation, and to demand often even less repair. With similar size of low-pressure cylinder this form of triple-expansion engine may give considerably greater power than the compound, with less serious stresses on the working-parts; and this difference, again, makes it practicable to build the former at as small cost as the latter, when of equal power.

The latest type of river and sound side-wheel steamer is illustrated by the *Plymouth*, of the Fall River line, between New York and New England, traversing Long Island Sound.

The dimensions of the *Plymouth* are as follows:

	Feet.	Inches.
Length over all----------	366	--
Length on water-line----------	351	8
Breadth over guards----------	87	--
Breadth of hull----------	50	--
Depth at lowest point of sheer----------	21	--
Draught of water, light----------	11	--
Distance from keel to top of deck-house on dome----------	59	-- 3

The ship is constructed of iron, on the double-hull, bracket-plate and longitudinal system, securing safety against sinking or destruction by fire.



FALL RIVER LINE STEAMER "PLYMOUTH."

The *Plymouth* is fitted with a four-cylinder, double-inclined, triple-expansion, direct-acting engine of 5,500 indicated horse-power. The high-pressure cylinder, 47 inches diameter, takes steam at a pressure of 160 pounds per square inch. The intermediate cylinder is 75 inches in diameter. The high-pressure and intermediate cylinders are placed forward of the center of the shaft, and are connected to crank-pins placed at right-angles. Abaft the shaft are two low-pressure cylinders, each 81½ inches in diameter. One low-pressure is connected to the same crank-pin as the high-pressure cylinder, and the other to the same crank-pin as the intermediate cylinder. All pistons have a stroke of 8 feet 3 inches. Each of the two low-pressure cylinders is supplied with its own air-pump and surface-condenser, with independent centrifugal circulating pump.

The engine keelsons and frames are made of steel, strengthened in the usual manner with angles and intercostals. The wheels are of the feathering type, 30 feet diameter outside the buckets. Each wheel has 12 curved steel buckets, each being 4 feet wide and 13 feet 3 inches long.*

The most remarkable work yet performed in marine engineering is illustrated in the torpedo-boats and "torpedo-destroyers" built by Thorneycroft, Yarrow, Herreshoff and other makers, some of which have been given speeds exceeding thirty knots an hour on their trial trips, notwithstanding the fact that they are small craft and thus "handicapped." The machinery of these little vessels exhibits the most wonderful concentration of power into small space, and with little weight, that has ever been seen in any department of engineering. Engines of three thousand and four thousand horse-power are condensed into the hulls of crafts 150 to 200 feet long, and weights are reduced to fifty pounds or less per horse-power. In the earlier forms of these boats the locomotive type of boiler was employed; this is giving place, in the later, to the water-tube or sectional class used earlier in this century by Stevens, Albans and Perkins, with high-pressure steam. Triple-expansion engines are adopted commonly now, and their economy permits long distances to be traversed by these small crafts at half-speed or less. The largest classes of war-vessels have enormously powerful engines, but are not as remarkable for their power per ton or per cubic foot of space occupied. The United States ship *Columbia* has a displacement of 7,500 tons, and, exerting 23,000 horse-power, makes a speed at sea of 23 knots an hour—27 miles. The United States "battleships" have 11,000 tons displacement, but are of but one half the power of the *Columbia* and the *Minneapolis*, steaming, at full speed, 15 knots. British naval vessels have a maximum displacement of about 15,000 tons and a speed, as listed, of 18 knots; others of 14,000 tons and 25,000 horse-power attain 22 knots. The Cunard steamers *Campania* and *Lucania* are of 30,000 horse-power and 23 knots speed.

R. H. Thurston.

MARINE GLUE. See Gelatine, Vol. X, p. 120.

MARINE HOSPITAL SERVICE is a bureau of the United States Government connected with the Treasury Department. The surgeon-general of the public health and marine hospital service is charged with the supervision of the marine hospitals and other relief stations of the service, and the care of the sick and injured and disabled

* *Manual of the Steam Engine*, Vol. I, p. 227.

seamen taken from merchant vessels of the United States, on ocean, lakes or rivers, and from vessels of the light-house service, the revenue cutter service, the coast and geodetic survey, and the life-saving service. This supervision comprises the furnishing of medical, surgical and other supplies, the assignment of orders to medical officers, etc. The same officer is also charged with the framing of regulations for the prevention of the introduction and spread of contagious diseases, and with the conduct of the quarantine service of the United States. Formerly the service was paid for by a small monthly tax on seamen, but this has been changed to a tax on the tonnage of vessels and an appropriation is also made from the United States Treasury. The hospital service, beside being of inestimable benefit to seamen, is of much interest to the medical and surgical profession. The surgeon-general makes each year an elaborate report to the Secretary of the Treasury, enumerating and classifying all the cases which have been treated, and describing professionally many of the more interesting ones, so that the report is practically a treatise on medicine and surgery, and a manual of hygiene and sanitation. The *personnel* of the service includes the surgeon-general, hospital surgeons, passed assistant surgeons, assistant surgeons, and acting assistant surgeons. See HOSPITALS, Vol. XII, p. 320.

W.F.J.

MARINE INSURANCE IN THE UNITED STATES. The earliest record of marine insurance by citizens or corporations of the United States is found in an old marine policy issued at Boston, June 4, 1745, subscribed by five merchants of that city. The number of the policy, 1,155, would indicate that a not inconsiderable number of transactions of this kind took place about that time, and evidently on the individual underwriting plan, after the manner of the Lloyds of London. It is probable that other limited transactions of this kind before the Revolutionary War took place, but if such was the case no reliable record has been discovered. The first authentic account of corporate marine insurance dates back to 1794, at Philadelphia, when the Insurance Company of North America was incorporated with a capital of $600,000, which grew out of an association of capitalists called the "Universal Tontine Association," and which issued some marine policies two years before the organization of the Insurance Company of North America, which down to the present time has transacted a large marine business in connection with fire insurance. Four days later than the date of the above incorporation, the Insurance Company of the State of Pennsylvania was organized, and also transacted a marine business. In 1795 the Massachusetts Fire and Marine Insurance Company was organized in Boston, and a year later the New York Insurance Company, in New York City began as a mutual company, being organized as a stock company in 1798 and transacting the business of marine insurance. There followed at intervals several companies, some for marine business exclusively and others for both fire and marine, at New York, Boston, Providence, Rhode Island, New Orleans and Philadelphia. Many of them had a short career, and a few have continued to the present day. Several of the British fire and marine companies which at various times during the past 45 years have established United States branches have written marine insurance, but of the mixed fire and marine companies only two transact a marine business in this county at the present time.

In the United States the inland-marine business is extensive; i.e., the insurance of vessels and cargoes on the great chain of lakes, and of steamers and freight on our rivers. With the exception of twelve foreign companies, British, Swiss and German, and half a dozen American companies, the companies engaged in marine insurance transact mainly an inland marine business. At San Francisco, however, for many years, foreign marine companies, Chinese, Swiss, British and German and one or two French companies, have done business exclusively at that port, the number varying from 20 to 28. In 1895 these companies, to the number of 27, wrote $67,396,488 of marine risks, and collected $535,800 in premiums. In 1890, the number of these companies being about the same, the risks written on the Pacific coast were about $65,000,000 and the premiums about $560,000. Five years earlier, in 1885, 25 companies wrote a little over $38,000,000 and collected in premiums $470,000; while in 1880 the 16 foreign marine companies wrote $34,274,286 in risks and collected $554,450 in premiums. Several American and some British and other foreign companies also have, for a period prior to 1880 and continuously since, done business in San Francisco, which are not included in the above, as we have included these in the general statistics for the entire United States which are to follow. Beginning with 1880, it will be found that, exclusive of the foreign business in California above given, the total marine and inland marine business of the United States, stated by five-year periods, has been about as follows:

YEAR.	NO. OF COMPANIES	RISKS WRITTEN.	PREMIUMS RECEIVED.
1880	108	$2,200,002,550	$17,996,682
1885	70	1,893,173,000	16,325,890
1890	69	2,808,035,800	15,520,560
1895	47	2,798,683,000	14,808,950

Of the above companies, from eight to twelve foreign and from five to eighteen American companies have done almost exclusively an ocean-marine business since 1880, the American companies gradually decreasing and the foreign companies more than holding their own. In 1880 there were about twenty-five companies, included in our enumeration, engaged in a limited inland-marine business, especially on the rivers, which were also doing a fire-insurance business, and soon abandoned the marine business, several before 1885 going out of business altogether. In 1890, 46 American and two Canadian companies

were engaged in the inland-marine business, while in 1895 the number had decreased almost one half, although the amount of business of this class was about as large as ever. The business has become concentrated in the hands of fewer companies, including some of the foreign companies. Including the marine business done at San Francisco, the total marine and inland-marine business in 1895 in the United States closely approximated $2,865,000,000, on which the premiums were $15,400,000. It will be seen by the variation of premiums received in the aggregate amount of risks written, that the rate charged has fluctuated considerably. For the four periods above named the average rate was 86 cents per each $100 at risk in 1880; in 1885, 87 cents; in 1890, 60 cents, and in 1895, 52 cents.

At the present time American companies do not take kindly to the ocean-marine business, but, to the number of about twenty-five strong companies, engage very liberally in that of inland-marine in connection with a large fire-insurance business. A few small but cautious companies, in addition, write limited lines on this class of business, but the tendency is steadily toward the handling of the inland-marine business by a small number of companies as compared with a few years ago. In Canada, Canadian and British companies for a good while have transacted the business of inland-marine, and sometimes one or two American companies have also done a limited business there. In 1895, two Canadian, three British companies and one American company wrote in the Dominion $25,395,155 of inland risks, and collected thereon $76,345 in premiums.

A. H. Huling.

MARINE LEAGUE, a distance of three nautical miles, generally acknowledged as the shore distance over which the nations severally have exclusive jurisdiction upon the sea-water abutting against their respective coasts. With respect to the limitation of jurisdiction on the sea-coast, two principles are universally admitted: 1. That the sea is open to all nations; and 2. That there is a portion adjacent to every nation over which the sovereignty of that nation may rightly extend, to the exclusion of every other political claim.

It is difficult, in many cases, to define the limits of these waters.* Such portions as harbors and waters above low-water mark are recognized as within the *lex loci*, and those persons on board of ships are subject to the local laws and regulations as fully as if they were residing on the land. With reference to parts more seaward, the question is more complicated. The cannon-shot limit is the popular rule. For all practical purposes, this is the marine league of three miles. The United States and Great Britain have agreed to this claim as between themselves, but other nations have not. Norway specified in one case four miles, England six miles under an act of George IV, and again twelve miles under the Hovering Acts (q.v., in these Supplements). The United States, in 1875, claimed the same for revenue purposes, and even as far as the Gulf Stream for the exclusion of belligerents. Spain claimed a six-mile belt around Cuba. Great Britain has been granted, by China, jurisdiction over British subjects on vessels up to one hundred miles from the coast of China. The question of jurisdiction over bays has been much disputed. St. George's Channel has diplomatically been acknowledged to be British territory, and the Bay of Newfoundland has been legislated for as if British territory. Generally speaking, however, the three-mile limit is acknowledged as the limit. Foreigners have a right of user of such waters, subject to definite limitations. Belligerent acts must not be carried on there; piracy and smuggling can be stopped and quarantine regulations enforced. The one general rule, is that the state may exercise any rights over these waters in defense of itself and its own interest, or in maintaining the right of free passage to all others.

*See *Government Year-Book*, edited by Lewis Sargent, 1889; and *Commentaries on International Law*, by Sir Robert Filmore.

MARINETTE, the county seat of Marinette County, Wisconsin, and the most important city in the northeastern part of that state. It lies on the western shore of Green Bay, at the mouth of the Menominee River, opposite the city of Menominee, Michigan, and is a great center of the lumber, paper-pulp, and iron trades. It has much water-borne commerce on Green Bay and Lake Michigan, and is reached by the Chicago & Northwestern, and the Chicago, Milwaukee & St. Paul railroads. It has an excellent harbor, a large traffic on the river, and is connected with the Michigan shore by several bridges. Its population in 1900 was 16,195. W.F.J.

MARINO. In 1872 the republic of Marino concluded a treaty of protective friendship with Italy. The treaty was abrogated by the Italian government in 1895. The state has no public debt and its annual revenue and expenditure average about 227,000 lire. Population 1896, 8,200. See also San Marino, Vol. XXI, pp. 279, 280.

MARIO, Giuseppe, Marquis of Candia, singer, was born at Cagliari, near Turin, Italy, on October 17, 1810, was educated in the Turin Military Academy, and entered the Italian (Sardinian) army, in which his father was an officer, but became involved in trouble, and fled to Paris, where he studied music. His fine tenor voice attracted attention, and he became a concert singer to raise money to pay his creditors. In December, 1838, he made his operatic début in *Robert the Devil*, and was highly successful. Thereafter he was associated with such artists as Rubini, Lablache, Malibran, Sontag, Persiani, and Julia Grisi, whom he married, and ranked as the foremost operatic tenor of the world. He was heard in all the countries of Europe and in America, in a great range of operas. He retired in 1867, and died in Rome on December 11, 1883, leaving a splendid name in operatic history. W.F.J.

MARIOLATRY. See MARY, Vol. XV, pp. 596–599.

MARION, a town and the capital of Perry County, western central Alabama, 22 miles N.W. of Selma, on the Southern railroad. It is in an agricultural region, and has railroad repair-shops and a carriage factory. It is the seat of Marion Military Institute and of two seminaries for women,—Marion (non-sectarian, 1836) and Judson (Baptist, 1839). Population 1900, 1,698.

MARION, a city and the capital of Williamson County, southern Illinois, 50 miles N.N.E. of Cairo, on the Chicago, Paducah and Memphis and the St. Louis, Alton and Terre Haute railroads. It is in a fertile farming and live-stock raising region, and has a large shipping trade in grain, tobacco and live-stock. It has flour, woolen and cotton mills. In the vicinity are large coal-mines. Population 1900, 2,510.

MARION, a city and the capital of Grant County, northeastern central Indiana, 60 miles N.N.E. of Indianapolis, on the Mississinewa River, and on the Pittsburg, Cincinnati, Chicago and St. Louis, the Cleveland, Cincinnati, Chicago and St. Louis and the Toledo, St. Louis and Kansas City railroads. It contains wood-working factories, flax factories, a foundry and flour-mills. Population 1890, 8,769; 1900, 17,337.

MARION, a city and the capital of Linn County, central eastern Iowa, 58 miles S.W. of Dubuque, on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads. It is in an agricultural and stock-raising region, and contains foundries, factories and mills for the manufacture of lint, flour, beer, carriages, furniture and farm implements. Population 1890, 3,094; 1900, 4,102.

MARION, a city and the capital of Marion County, eastern central Kansas, 48 miles N.N.E. of Wichita, on the Cottonwood River, and on the Atchison, Topeka and Santa Fé and the Chicago, Rock Island and Pacific railroads. It is in a fruit and stock raising region, and has springs of medicinal value. It is a trade center, and has an iron foundry and flour-mills. Population 1890, 2,047; 1900, 1,824.

MARION, a city and the capital of Marion County, central Ohio, 40 miles N. of Columbus, on the New York, Lake Erie and Western and the Cleveland, Cincinnati, Chicago and St. Louis railroads. It contains grain-elevators, machine-shops and manufactories of carriages, wagons, rakes, steam-shovels, malleable iron, thrashers, engines, sulkies and chains. Population 1890, 8,327; 1900, 11,862.

MARION, a town and the capital of Marion County, eastern South Carolina, 56 miles E.N.E. of Sumter, on Cat Fish Creek, and on the Atlantic Coast Line railroad. It is the trade center of a cotton region. Population 1900, 1,166.

MARION, a town and the capital of Smyth County, western Virginia, 145 miles W. of Lynchburg, in the Blue Ridge Mountains, on the Norfolk and Western railroad. It is in a cattle-raising and mining region, and has manufactories of iron and of pigments from barytes, of agricultural implements and castings. It is the seat of Marion Female College and of the Southwestern Lunatic Asylum. Population 1890, 1,651; 1900, 2,045.

MARIOTTE'S LAW. See ATMOSPHERE, Vol. III, p. 32.

MARIOTTI. See GALLENGA, in these Supplements.

MARIPOSA LILY, a name sometimes given to species of the genus *Calochortus*, lily-like plants of the western United States and Mexico. The genus contains thirty or forty species, most of which bear large and brilliant terminal flowers. The genus is a favorite with horticulturists, who have produced from it a number of showy hybrids.

MARIPOSAN INDIANS, a linguistic stock of American Indians including a number of small tribes, the principal divisions being the Cholovone and Yokuts. They formerly occupied the country south of the Fresno River, California, as far as the Mojave Desert. They always were considered a peaceful tribe. They have rapidly decreased in numbers, numbering in 1850 about three thousand, and in 1895 about one hundred and sixty. They are under the mission agency in California.

MARITIME LAW. See SEA LAWS, Vol. XXI, pp. 610–613.

MARITZA, Turkey, a river flowing into the Ægean Sea at Enos, after a winding east by south course of over 260 miles from its sources in the Balkan Mountains in eastern Rumelia; it is navigable only by river boats to Adrianople. The river, known to the Romans and the ancient world as the Hebrus, waters the fertile plain of Philippopolis, and the trans-European railway line follows the whole course of its valley from beyond Sofia, in Bulgaria, to its mouth. C.L.S.

MARJORAM. See HORTICULTURE, Vol. XII, p. 302.

MARK, a German coin. See MONEY, Vol. XVI, p. 758.

MARKET DRAYTON. See DRAYTON-IN-HALES, in these Supplements.

MARKET GARDENS OF THE U. S. See AGRICULTURE, in these Supplements.

MARKET OVERT. See *Personal Estate*, under SALE, Vol. XXI, p. 217; and *Stolen Goods*, under THEFT, Vol. XXIII, p. 252.

MARKHAM, CLEMENTS ROBERT, an English author and geographer; born at Stirlingfleet, England, July 20, 1830. He was educated at Westminster School, was appointed a naval cadet in July, 1844, and was made a lieutenant in the Royal Navy in 1851. He accompanied the Franklin Search Expedition, traveled in Peru in 1852 and 1860, the second journey being undertaken to get cinchona seeds for planting in India. After spending two years in Ceylon and India, he became secretary of the India office in 1867 and curator of its geographical department in 1868. In 1858 he had been appointed secretary of the Hakluyt Society, of which he became president in 1890. In 1863 he was made secretary of the Royal Geographical Society, and in 1893 became its

president. He was six years editor of the *Geographical Magazine*, and has published *Cuzco and Lima* (1856); *Travels in Peru and India* (1862); *The Arctic Navy List* (1875); *Life of John Davis* (1889); *Major James Rennell* (1895); *Richard Hakluyt* (1896), and an English version of a Peruvian drama, *Olianta* (1871). He was knighted in 1896. W.M.C.

CLEMENTS R. MARKHAM.

MARKHAM, EDWIN, an American poet; born in Oregon City, Oregon, April 23, 1852; went to California in 1857; worked his way through the San José Normal School and Santa Rosa College; began to write verse and stories for papers and magazines at an early age; entered the teacher's profession and became principal and superintendent of schools. In 1899 he removed to Brooklyn, N. Y., and later to Staten Island. The poem from which he gained his first great world-wide fame was *The Man with the Hoe* (1898). It was published in 1899, in book form, with other poems. Some of his other books include *The End of the Century* (1899); *"Lincoln, the Great Commoner"* (1900); *Lincoln and Other Poems* (1901); *Field Folk; Interpretations of Millet* (1903). A.R.R.

MARKS, HENRY STACY, an English artist; born in London, September 13, 1829; studied at the Royal Academy; under Picot, in Paris, and at L'École des Beaux-Arts. His first picture, after returning to England, appeared at the Royal Academy in 1853. In 1878 he became a Royal Academician. Among his numerous paintings are *Christopher Sly* (1855); *A Day's Earnings* (1858); *Dogberry's Charge to the Watch* (1859); *Jolly Post-Boys* (1875); *Convocation* (1878), and *Hermit and the Pelicans* (1888). He wrote *Pen and Pencil Sketches*. Died in London, January 9, 1898.

MARLBORO, a city in Middlesex Co., Mass.; has over 20 shoe factories, a public library with 16,000 volumes, gas and electric lights, and an electric railway. Pop., 1890, 13,805; 1900, 13,609. See also MARLBOROUGH, Vol. XV, p. 560.

MARLBOROUGH (CHARLES RICHARD JOHN SPENCER CHURCHILL), DUKE OF, the ninth of the title; born at Simla, India, Nov. 13, 1871; Nov. 6, 1895, married Miss Consuelo Vanderbilt, daughter of William K. Vanderbilt. See also MARLBOROUGH, Vol. XV, p. 560.

MARLIN, a town and the capital of Falls Co., Texas, 18 miles S.E. of Waco, on the Waco and North-Western railroad, two miles E. of the Brazos River. It has two seminaries. Pop., 1900, 3,092.

MARLITT, E., the pseudonym of JOHN, EUGENIE; q. v., in these Supplements.

MARLOWE, JULIA. See TABOR, JULIA MARLOWE, in these Supplements.

MARMADUKE, JOHN SINGLETON, soldier, was a native of the state of Missouri, and after studying at Harvard and Yale, was appointed from Missouri a cadet at West Point. He was graduated in 1857, and entered the infantry, serving under Albert Sidney Johnson in Utah and elsewhere. At the beginning of the Civil War he was inclined toward the Federal side, but after a disagreement with the governor of the state and other officers, he entered the Confederate service, and was a conspicious cavalry officer. He distinguished himself at Shiloh, and as a leader of a division of Price's army in his raids. After the war he remained in Missouri, where he was railroad commissioner, and held other offices. In 1884 he was elected governor of the state, and died on December 28, 1887. W.F.J.

MARMORA, SEA OF. See BLACK SEA, III.

MARMORA (ALBERT FERRERO), CONTI DELLA, a Sardinian geologist and general, was born in Turin, Italy, in 1789. He joined the French army and gained distinction during Napoleon's campaigns (1808–14), but becoming involved in political disturbances was banished from France in 1821. He returned to Sardinia and devoted himself to a study of the geology and the physical features of the island. Afterward he wrote an extensive account of his travels and studies in that country, and this was published, in three volumes, in 1831. He was elected member of the Academy of Sciences, Turin; in 1840 became major-general in the Italian army; a senator in 1848; a lieutenant-general in 1849. He died in 1863.—His brother, ALPHONSO FERRERO, Marchése della Marmora, was born in Turin, Nov. 18, 1804. He was educated in the military school of Turin and became an officer and instructor in the Sardinian army. He took part in the Austrian war of 1849, and the following year was appointed Minister of War by King Victor Emmanuel. He was appointed general (1856); commander-in-chief (1860); Premier of the Cabinet (1864); minister to Paris (1867); viceroy of Rome (1870). He died in Florence, Jan. 5, 1878.

Revised by R.W.C.

MARMOSET. See APE, Vol. II, p. 136.

MARNIX, FILIPS VAN, Lord of St. Aldegonde. See HOLLAND, Vol. XII, p. 96.

MARONI RIVER. See GUIANA, XI, 223.

MAROS RIVER, a stream of eastern Hungary, rising in the eastern Carpathians, and flowing with a very irregular but generally western course, to the Theiss, which it joins near Szegedin. It is a great commercial route, being navigable as far as Ujvar, a distance of 228 miles. Total length, 400 miles.

MARQUE, LETTERS OF. See PRIVATEER, XIX.

MARQUETRY OR MARQUETERIE. See BUHL-WORK, Vol. IV, p. 399.

MARQUETTE, a city of Michigan, notable as a summer resort. It has an excellent harbor, and is an important shipping-point. It has two public libraries, iron-mines, brown-sandstone quarries and large lumber interests. Population, 1890, 9,093; 1900, 10,058. See also MARQUETTE, Vol. XV, 571.

MARQUEZ, JOSÉ ARNALDO. See PERU, XVIII.

MARRIAGE LAWS IN UNITED STATES. In most of the states of the United States laws have been enacted prescribing the method required to solemnize a marriage, the minimum age at which marriage is legal, the age at which marriage licenses

may be issued without consent of parents, the degrees of consanguinity which will render marriage illegal, and the circumstances which will render it void or voidable. These provisions are in many respects uniform, while in others they vary widely in the different states. In most states, while a marriage license is required by law, and persons under certain ages, usually under the age of majority, are prohibited from marrying except upon the consent of their parents, yet marriages, when consummated without complying with these provisions, are nevertheless valid, and the only effect is to make those who have violated the law liable to punishment for the offense.

The policy of the law throughout the United States is to sustain the validity of marriages in almost all cases, when the persons have reached the age of puberty and are free from other matrimonial ties.

Marriages legally performed in other countries will receive full recognition in the United States, unless they be incestuous or polygamous. The different states will also fully recognize a marriage consummated in another state, between parties who were at the time citizens thereof, even if such marriage would be void under its own laws.

As to the laws of particular states, it may be said, generally, that all states require the procurement of a marriage license from the officer of the county authorized by law to issue them, except the states of New York, South Carolina and Wisconsin. The age prescribed by statute in the various states at which marriage may be legally performed without the necessity of obtaining the consent of parents, and the age below which it is illegal in any event, together with the degrees of consanguinity and affinity within which marriage is prohibited, are given in the subjoined table. In many states, however, the provisions rendering marriages illegal under conditions named are such as to make such marriages voidable only, and not absolutely void. The only circumstances under which marriages are universally held to be void are, when the parties are related to each other within the degrees prohibited by law so as to render the marriage incestuous, and when one of the parties has another husband or wife living at the time of the marriage. But in the case of a bigamous marriage the offense is not punishable if the prior husband or wife has been absent and not heard from for a period of time sufficient to raise a legal presumption of death.

In the following states, marriages between persons, one or both of whom are below the age at which marriage, with the consent of parents, is legal, are declared, by statute, to be void: Arkansas, Connecticut, Kansas, Kentucky, Massachusetts, Michigan, New Mexico, Utah, Virginia and West Virginia. In other states, such marriages are held merely voidable, at the option of the person under disability; and it is probable that such will also be the holding of the courts in some of the states above named, and if the parties continue to cohabit as husband and wife after reaching the age at which marriage is lawful, the courts will recognize the marriage as valid. In the states of Alabama, Arizona, Arkansas, California, Colorado, Delaware, Florida, Georgia, Idaho, Indiana, Kentucky, Louisiana, Maine, Mississippi, Missouri, Nebraska, North Carolina, Oregon, South Carolina, Tennessee, Texas, Utah, Virginia and West Virginia, marriages between white persons and negroes are declared to be void. The portion of negro blood which will render a person a negro, within the meaning of these acts, is variously fixed from one eighth to one fourth. In some of the states above named this prohibition is extended to include whites and Mongolians. In all states other than those above named such marriages are valid.

In Delaware, District of Columbia, Georgia, Illinois, Indiana, Kansas, Kentucky, Maine, Massachusetts, Michigan, Nebraska, Ohio, Rhode Island, South Carolina, Utah, and West Virginia, marriages are said to be void when one of the parties is an idiot or insane person, and in other states such marriages are voidable. Impotency will also render a marriage void in Georgia, Iowa, Maryland and Texas, while in other states it will only make them voidable. In Maine and Massachusetts, marriages solemnized between parties who go to another state to marry, for the purpose of avoiding the law, are declared to be void. In Alabama, if one of the parties has been guilty of the crime against nature, the marriage is voidable, at the option of the other.

Pregnancy of a woman at the time of the marriage, by another than her husband, renders the marriage voidable, at the instance of the husband, in Kansas, Maryland, Tennessee, Virginia, West Virginia and Wyoming.

In most of the states no particular method of solemnizing a marriage is absolutely essential, although in many states one or more methods are established by statute as proper and sufficient. Usually, when an unmarried man and woman cohabit as husband and wife for such a length of time as to create the conditions and relations of husband and wife, the law will treat them as married. Such marriages, when no ceremony of marrige had been performed, are termed common-law marriages, and are valid in most states.

The above provisions as to the laws of the various states are only general, and many exceptions and modifications, too numerous and intricate to be here given, will be found upon examination of the statutes.

Any careful study of the marriage laws of a particular state must be made from the statutes and courts decisions of the state in question. This is especially true as to whether certain conditions will render a marriage void or voidable, as these questions are the subject of constant change by legislation, acts and various constructions by different courts.

The question of uniformity of Marriage Laws has moved twenty-eight states to create commissions on the subject (see DIVORCE, in these Supplements). The creation of the commissions has naturally moved slowly. To get them at all, no salary or pay except for expenses could be attached to the office. Almost invariably the members are lawyers. Some useful recommendations for uniformity in Marriage and Divorce laws have been made, and laid before the legislature.

State.	Minimum Age for Marriage With Consent of Parents.		Minimum Age for Marriage Without Consent of Parents.		Degrees of Consanguinity Within Which Marriage is Not Permitted.		Degrees of Direct Affinity Within Which Marriage is Not Permitted.	
	Male.	Female.	Male.	Female.	Lineal.	Collateral.	Ascending.	Descending.
Alabama	17	14	21	18	2	*3	2	2
Arizona	18	16	21	18	all	*†3	--	--
Arkansas	17	14	21	18	all	*†3	--	--
California	18	15	21	18	all	*3	--	--
Colorado	14	12	21	18	3	*3	--	--
Connecticut	14	12	21	21	2	3	1	1
Delaware	18	16	21	18	2	3	2	2
Dist. of Columbia	14	12	21	16	2	3	2	2
Florida	14	12	21	21	all	3	--	--
Georgia	17	14	--	18	3	3	1	2
Idaho	14	12	18	16	all	*3	--	--
Illinois	17	14	21	18	all	*†3	--	--
Indiana	18	16	21	18	all	4	--	--
Iowa	16	14	21	18	2	3	1	2
Kansas	14	12	21	18	all	*†3	--	--
Kentucky	14	12	21	21	2	3	2	2
Louisiana	14	12	21	21	all	*3	--	--
Maine	14	12	21	18	2	3	2	2
Maryland	14	12	21	16	2	3	2	2
Massachusetts	14	12	18	16	2	3	2	2
Michigan	18	16	21	18	2	3	2	2
Minnesota	18	15	21	18	all	3	1	2
Mississippi	14	12	21	18	2	*3	--	--
Missouri	15	12	21	18	all	*†3	--	--
Montana	18	16	21	18	all	*3	--	--
Nebraska	18	16	21	18	2	*3	--	--
Nevada	18	16	21	18	all	†3	--	--
New Hampshire	14	13	--	--	2	†3	1	2
New Jersey	14	12	21	18	2	3	2	2
New Mexico	18	15	21	18	all	*3	--	--
New York	18	16	21	21	all	2	--	--
North Carolina	16	14	18	18	all	3	--	--
North Dakota	16	13	21	18	all	†3	--	--
Ohio	18	16	21	18	all	4	--	--
Oregon	18	15	21	18	all	†3	--	--
Oklahoma	14	12	18	15	all	†2	1	1
Pennsylvania	14	12	21	21	2	3	1	2
Rhode Island	14	12	21	21	2	3	2	2
South Carolina	14	12	21	21	2	3	2	2
South Dakota	18	15	21	21	all	4	--	--
Tennessee	14	12	--	--	all	3	--	--
Texas	16	14	21	18	2	3	1	2
Utah	14	12	21	18	3	3	--	--
Vermont	14	12	21	18	2	3	2	2
Virginia	14	12	21	21	2	*3	2	2
Washington	14	12	21	18	all	4	1	1
West Virginia	14	12	21	21	2	*3	--	--
Wisconsin	18	15	21	18	all	3	--	--
Wyoming	18	16	21	21	2	*†3	--	--

MARRIED WOMEN. See Husband and Wife, Vol. XII, pp. 415–418.

MARROW. See Anatomy, Vol. I, p. 750.

MARRYATT, Florence. See Lean, Mrs. Frances, in these Supplements.

MARS, a planet. See Astronomy, Vol. II, pp. 703–705; and in these Supplements; also Tides, Vol. XXIII, p. 406.

MARSDEN, Samuel, a British missionary, often styled the "Apostle of New Zealand." See New Zealand, Vol. XVII, p. 484.

MARSEILLAISE, The. See Rouget de Lisle, Vol. XXI, p. 18.

MARSEILLES, a city of Lasalle County, northeastern Illinois, 65 miles W.S.W. of Chicago, on the north bank of the Illinois River, on the Illinois and Michigan canal, and on the Chicago, Rock Island and Pacific railroad. It has an excellent water-power, obtained by a dam one thousand feet long across the river, has a foundry, and manufactories of paper, flour and agricultural implements. There are coal-mines in the vicinity. Population 1890, 2,210; 1900, 2,559.

MARSEILLES, capital of the department of the Bouches-du-Rhône and since 1900 the second city of France. It is the principal seaport of France and also the chief seaport of the Mediterranean. In Europe it ranks after London, Liverpool and Hamburg. The recent improvement of canals and building of additional railroads have greatly enhanced Marseilles' commercial facilities. Wise sanitary measures have freed the city from the scourge of epidemics of former years. In education, public buildings and industries it compares favorably with other progressive cities. Population, 1901, 494,769. See Marseilles, Vol. XV, p. 578.

MARSH, Arthur Richmond, educator; born in Newport, R. I., Oct. 3, 1861; was graduated at Harvard University in 1883, and three years afterward was called to the chair of English in the University of Kansas, where he remained till 1889, when he went to Europe for travel and study. In 1891 he was appointed assistant professor of comparative literature at Harvard University; resigned in 1899. G.J.H.

MARSH, Othniel Charles, scientist; was born at Lockport, N. Y., Oct. 29, 1831, and was educated at Yale College (1860) and Sheffield Scientific School (1862). He also studied at Berlin, Heidelberg and Breslau. In 1866 he became professor of palæontology at Yale, and remained in that place during the remainder of his life. Being the nephew and heir of George Peabody, he had a fortune which enabled him to prosecute whatever scientific researches he desired without regard to cost. He explored the Rocky Mountains and the Appalachian ranges with unrivalled care, and discovered hundreds of species of fossil vertebrates, including many of the highest interest. He was recognized throughout the world as one of the foremost naturalists of the age. His priceless collections of specimens he left to the Peabody Museum at Yale, which his uncle had founded. He died on March 18, 1899. W.F.J.

OTHNIEL C. MARSH.

MARSHALL, a city and the capital of Clark County, central eastern Illinois, 15 miles S. of

* When the relation is of the half-blood, marriage is prohibited within two degrees collateral consanguinity.

† Marriage between cousins is also prohibited.

Paris, on the Terre Haute and Indianapolis and the Cleveland, Cincinnati, Chicago and St. Louis railroads. It is in a grain and stock-raising region, and has several woolen, planing and flour mills. It has a considerable trade. Pop. 1900, 2,077.

MARSHALL, a city and the capital of Calhoun County, central southern Michigan, 30 miles E. of Kalamazoo, on the Kalamazoo River, and on the Cincinnati, Jackson and Mackinac and the Michigan Central railroads. It has the repair-shops of the Michigan Central railroad, a large carriage factory, and manufactories of plows, wind-mills, carpets, bicycles, school furniture, and stoves and furnaces. Population 1890, 3,968; 1900, 4,370.

MARSHALL, a village and the county seat of Lyon County, Minnesota, in the southwestern part of the state. It lies at the intersection of the Great Northern, and the Chicago & Northwestern railroads, in a growing agricultural country, and had in 1900 a population of 2,088. W.F.J.

MARSHALL, a city and the capital of Saline County, Mo., 74 miles E. of Kansas City, on the Chicago and Alton and the Missouri Pacific railroads. It is in a fine agricultural region, where anthracite coal and building-stone abound. It has carriage factories, a cannery and salt springs. It is the seat of Missouri Valley College, founded in 1889, which in 1901 had 13 instructors, 221 students, and a library of 7,000 volumes. It also contains St. Xavier's Academy (Roman Catholic) and a convent. Pop. 1890, 4,297; 1900, 5,086.

MARSHALL, a city and the capital of Harrison County, northeastern Texas, 143 miles E. of Dallas, on the Texas and Pacific and the Paris, Marshall and Sabine Pass railroads. It is in a cotton, live-stock and lumbering region, and has railroad shops, foundries, car-wheel works, a plow factory, cotton-gin factory, ice factory, saw and planing mills, a cotton-compress, wood-working and furniture factories. In the vicinity are oak and pine timber, mineral springs, and deposits of iron. Wiley University is situated here; in 1901, it had 15 instructors, 439 students, and 4,200 volumes in its library. Bishop's College (Baptist) and a non-sectarian institute for women are also situated here. Population 1890, 7,207; 1900, 7,855.

MARSHALL ARCHIPELAGO. See MICRONESIA, Vol. XVI, pp. 266–268.

MARSHALL, ALFRED, an English political economist; born in London, July 26, 1842. He was educated at Cambridge, where he was second wrangler and fellow of St. John's, subsequently becoming principal of University College, Bristol. After going abroad for his health, he became fellow of Balliol in 1884, and was elected professor of political economy at Cambridge in the same year. He wrote with his wife (Miss Paley) *The Economics of Industry* in 1879, and afterwards *The Principles of Economics* (1890), and *Elements of Economics* (1891). W.M.C.

MARSHALL, HUMPHREY, soldier; was born at Frankfort, Ky., on January 13, 1812, and was graduated from West Point in 1832. He served in the Black Hawk and Mexican wars, leading the cavalry charge at Buena Vista. He was elected to Congress from Kentucky in 1848 and 1850, and again in 1854 and 1856, and was minister to China in 1852–54. In the Civil War he was a brigadier-general in the Confederate army, but resigned his commission and entered the Confederate Congress. After the war he settled at Louisville, Ky., and acquired an extensive law practice, but did not re-enter public life. He died on March 28, 1872. W.F.J.

MARSHALL, THOMAS ALEXANDER, an American jurist; born in Woodford, Ky., Jan. 15, 1794. He was graduated from Yale College in 1816, and in 1818 began practice at Frankfort, Ky. In 1819 he took up his residence in Paris, Ky., becoming prominent at the local bar and being elected to the State Legislature in 1827. In 1831 he was elected to Congress. He was appointed Judge of the Court of Appeals in 1836 and continued in this office until 1866, when he was made chief justice. He died in Louisville, April 17, 1871. W.M.C.

MARSHALL, WILLIAM CALDER, a British sculptor; born in Edinburgh in 1813. He studied in London under Chantrey and opened a studio there in 1839, having already begun to exhibit. He was elected associate of the Scottish Academy in 1842 and a fellow of the Royal Academy in 1852. His works include *The Broken Pitcher* (1842); *Rebecca* (1855); *The Dancing Girl Reposing* (1857); *Psyche* (1868); *The Prodigal Son* (1877), and statues in the Houses of Parliament, the Wellington monument and the agricultural group in the Hyde Park memorial. He died in London, England, June 16, 1894. W.M.C.

MARSHALLTOWN, a city of central Iowa. It has a high school, railway-shops, flour and oil mills, foundries, large grain-elevators, soap and pickle factories, machine-shops, pork and beef packing-houses and two factories for making steel fencing-wire. Its trade in wheat and flour is considerable. See also MARSHALLTOWN, Vol. XV, p. 581. Population 1890, 8,914, 1900, 11,544.

MARSHFIELD, a town of Coos County, southwestern Oregon, on Coos Bay, three miles E. of Empire, and on the Coos Bay, Roseburg and Eastern railroad. It has regular steamboat connection with San Francisco; is in a coal and lumber region, and has four saw-mills, a box and barrel factory, a tannery, and ship-building interests. Population 1890, 1,461; 1900, 1,391.

MARSHFIELD, a city in Wood County, Wisconsin, in the central part of the state. It lies among the western tributaries of the Wisconsin River, in an agricultural and lumbering country, 165 miles northwest of Milwaukee, and is reached by the Chicago & Northwestern, the Chicago, St. Paul, Minneapolis & Omaha, the Wisconsin Central, and the Marshfield & Southeastern railroads. It has machine shops and lumber mills. Its population in 1900 was 5,240. W.F.J.

MARSH-GAS. See METHYL, Vol. XVI, p. 202.

MARSH HARVESTER. See HARVESTING MACHINERY, in these Supplements.

MARSH-HAWK. Same as HARRIER, Vol. XI, pp. 439, 440.

MARSH-HEN, a name given to certain game-birds of the genus *Rallus*, found in the United States. The salt-water marsh-hen is *R. crepitans*, and the fresh-water form is *R. elegans*. These birds are sometimes called "clapper-rails."

MARSH-MALLOW. See MALLOW, Vol. XV, pp. 337, 338.

MARSH-MARIGOLD. See MARIGOLD, Vol. XV, p. 551.

MARSH-ROSEMARY, a common name given to *Statice Limonium*, a genus of the family *Plumbaginaceæ*, otherwise known as "sea-lavender." It grows along the coast in salt marshes, and has thick, pale leaves and scapes bearing panicles of lavender-colored flowers.

MARSILIA. See FERNS, Vol. IX, p. 93.

MARSIPOBRANCHII, a group of the lower vertebrates, formerly classed as fishes. The group includes the *Petromyzonids*, or "lampreys," and the *Myxinids*, or "hags." The term is equivalent to *Cyclostomi* and *Cyclostomata*. See also ICHTHYOLOGY, Vol. XII, p. 733.

MARSIVAN, MERSIVAN, OR MERSIFUN, Turkey in Asia, a town of the Vilayet of Sivas, northern Asia Minor, 60 miles S.W. of Samsun on the Black Sea. It manufactures textiles, has some silver mining, and is visited for the hot mineral springs at Khuza. Pop., 12,000. C.L.S.

MARS-LA-TOUR, France, a village in the department of Meurthe-et-Moselle, 12 miles south of Metz. With Vionville on the southeast, now in German territory, it witnessed the battle of the Franco-German War, Aug. 16, 1870, to which these villages give alternative names. C.L.S.

MARSTON, WESTLAND, a British dramatic poet; born in Boston, England, Jan. 30, 1820. In 1842 his *Patrician's Daughter*, a blank verse tragedy of the day, was brought out at Drury Lane by Macready. It was the first and also the most successful of more than a dozen plays. A collected edition of them, and his poetical works, appeared in two volumes in 1876. Besides these, he wrote a novel, a good book on *Our Recent Actors*, and a mass of poetic criticism. He died in London, Jan. 5, 1890. —His son, PHILIP BOURKE, a poet, was born in London, Aug. 13, 1850, and was blind from childhood. He was the subject of Hake's poem *The Blind Boy*, and Mrs. Craik's *Philip, My King*. After contributing a few poems to the *Cornhill Magazine* and other periodicals, he published his first volume of poems, entitled *Song-Tide* in 1870. This was followed by a second volume, entitled *All in All*, in 1875, and by a third, entitled *Wind-Voices*, in 1883. These poems gained for him the friendship of Swinburne and of Dante Gabriel Rossetti, who addressed to him a sonnet. Mr. Marston contributed poetical criticisms, essays and novelettes to various well-known periodicals. He died February 14, 1887.

MARSTON MOOR, BATTLE OF. See CROMWELL, Vol. VI, p. 530.

MARSTRAND, VILHELM NICOLAI, a Danish artist. See DENMARK, Vol. VII, p. 82.

MARSUPIALIA. See MAMMALIA, Vol. XV, p. 381.

MARSUS, DOMITIUS, a Roman poet of the Augustan age. Only fragments of his work, consisting of an epic, *Amazonis*, a treatise on wit, *De Urbanitate*, quoted by Quintilian, nine books of *Fabellæ*, and his most celebrated production, a collection of epigrams, under the title *Cicuta*, are extant. For his epigrams, Martial speaks of him in terms of the highest praise. A beautiful epigram on the death of Tibullus remains. See also TIBULLUS, Vol. XXIII, p. 371, 372.

MARTEL DE JANVILLE, SYBILLE-GABRIELLE-MARIE-ANTOINETTE DE RIQUETTI DE MIRABEAU, COMTESSE DE, a French novelist; born at Morbihan about 1850; in 1869 married Count Martel de Janville; began her literary career by the publication of sketches of life and manners contributed to *La Vie Parisienne*, assuming the pseudonym "Gyp." Her style is piquant and attractive, not wanting in fine humor, and marked by a subtle vein of moral feeling, characteristics which render her writings popular with the class of readers addressed. Her works include *Petit Bob* (1882); *La Vertu de la Baronne* (1882); *Autour du Mariage* (1883); *Un Homme Délicat* (1884); *Elles et Lui* (1885); *Mademoiselle Loulou* (1888); *Bob au Salon* (1888); *C'est nous qui sont l'Histoire* (1890); *Une Passionette* (1891); *Eux et Elle; Bijou* (1897).

MARTELLO TOWERS, solid round towers for coast defense, about forty feet high, situated on the beach. They were so called because at Martello Point, in Corsica, a small round tower stood admirably a severe cannonade from an English fleet under Lord Hood in 1794. They were extensively erected in England at the end of the eighteenth century as a defense against French invasion, but are now regarded as obsolete.

MARTENSEN, HANS LASSEN, theologian; was born at Flensburg, Denmark, on August 19, 1808, and was educated at the University of Copenhagen. He became professor of philosophy and also court preacher in 1845, and in 1854 was made metropolitan bishop and primate of Denmark. For many years he was one of the foremost bulwarks of conservative Lutheranism not only in Denmark but in all Europe, despite the many and bitter attacks which were made upon him. His two great works were *Christian Dogmatics* and *Christian Ethics*, both of which were promptly translated into English and German and have long been accounted theological classics. He also wrote *Meister Eckhart* and an *Autobiography*. He died on February 3, 1884. W.F.J.

MARTENSITE. See IRON AND STEEL, in these Supplements.

MARTHA'S VINEYARD. See MASSACHUSETTS, Vol. XV, p. 619.

MARTIAL LAW, the exercise of arbitrary power by the military authorities of a district or country wherein the ordinary administration has ceased to be operative, either on account of civil disturbance or because of the presence therein of a hostile force. It is not the same as "military law." The latter is the law which governs the army and soldiers at all times, but affects civilians only when they accompany a military force on active service. Martial law

is, in fact, no law at all, but simply the will of the supreme authority. No rules can be laid down for its application. The regulations of the United States army give some of the conditions under which martial law may be exercised and by which its functions are limited. In the United States, in time of peace, martial law must be declared by proclamation by the executive of the state or territory, or by the President of the United States, if there is a riot, insurrection or other disturbance. It is limited to the extent of the disturbed territory and the executive jurisdiction under the law. See also MILITARY LAW, Vol. XVI, pp. 308–312; and COURT-MARTIAL, Vol. VI, pp. 459–461.

MARTIN, BON LOUIS HENRI, a French historian; born in St. Quentin, Feb. 20, 1810. He wrote dramas and historical novels for a while, but about 1830 devoted himself to the writing of history, joining Paul Lacroix, "Bibliophile Jacob," in his project for a history of France in forty-eight volumes, consisting of extracts from historians and chronicles from the earliest period to 1830. He published the first volume in 1833, and thenceforward toiled alone at the vast undertaking, which was completed on a smaller scale in 1836. He then set himself to a still greater task, his *Histoire de France*. A third and much improved edition, containing a copious statement of the history and origin of the ancient Gauls, the development of the French language and literature, and the aspects of mediæval life and manners, earned the Gobert prize; the fourth edition was awarded by the Institution in 1869 the great prize of 20,000 francs. This work comes down only to 1789, yet it is one of the best works dealing in detail with the history of France. It shows impartiality and insight, is excellently arranged and admirably written. The continuation to the author's own time formed the less admirable *Histoire de France Moderne*. Martin acted for a time as mayor of one of the arrondissements of Paris, and was chosen Deputy for Aisne in 1871, and Senator in 1876. He was elected a member of the French Academy in 1878. He wrote several minor histories, such as the *Histoire de Soissons; Daniel Manin; Jeanne d'Arc; L'Unité Italienne;* and *La Russie d'Europe*. He died in Paris, Dec. 14, 1883.

MARTIN, HENRY NEWELL, biologist, was born at Newry, Ireland, on July 1, 1848, studied at University College, London, and at Cambridge, and came to America in 1876 as professor of biology at Johns Hopkins University. He was the author of *The Human Body* and *A Handbook of Vertebrate Dissection*, and assisted Huxley in the preparation of his *Practical Biology*. He died on October 29, 1896. W.F.J.

MARTIN, HOMER DODGE, artist, was born at Albany, N. Y., on October 28, 1836, and at five years old showed much ability in sketching. He was entirely self-taught, save for two weeks in the studio of James Hart, but began to exhibit at the National Academy at the age of twenty, and rose to a high rank among American landscape artists. Most of his work was done in New York. His pictures comprise scenes in the White Mountains, the Adirondacks, on the Hudson, on the Thames, in Normandy and elsewhere. He died at St. Paul, Minn., whither he had removed for his health, on February 12, 1897. W.F.J.

MARTIN, LUTHER, an American lawyer; born in New Brunswick, N. J., Feb. 9, 1748. He was graduated from Princeton, then the College of New Jersey, in 1766, studied law at Somerset, N. J., and Queenstown, Md., and was admitted to the Maryland bar in 1771. In 1774 he was appointed one of the commissioners to oppose the claims of Great Britain. In 1778 he became attorney-general of Maryland, and in 1787 was a delegate from Maryland to the Constitutional Convention. His opposition to the Constitution was such that rather than sign it, he withdrew from the convention, thus earning from Jefferson the sobriquet of "the Federal bull-dog." In 1804 he defended Samuel Chase in the latter's impeachment trial before the United States Senate. In 1805 he resigned his attorney-generalship and resumed private practice. In 1807 he appeared as leading counsel for Aaron Burr in his famous trial at Richmond, Va. From 1814 to 1816 he was chief judge of the Baltimore Court of Oyer and Terminer, and in 1818 was again attorney-general of Maryland. He wrote numerous pamphlets including *Modern Gratitude* (1801). He died in New York city at the home of Aaron Burr, July 10, 1826. W.M.C.

MARTIN, SAMUEL ALBERT, educator, was born at Canonsburg, Penn., on November 1, 1853, and was educated at Lafayette College and Princeton Theological Seminary. He has been a professor at Lincoln University and at Princeton Theological Seminary, and since 1895 president of Wilson College, Chambersburg, Penn. W.F.J.

MARTIN, SIR THEODORE, poet and biographer; was born in Edinburgh in 1816, and was educated at the university there. In 1846 he settled in London as a lawyer. His first writings were the *Bon Gaultier Ballads*, which he followed with translations of classic works from the German, Italian and Latin, conspicuous among them being some of the works of Goethe, Dante, Horace and Heine. In 1863 he published a volume of poems, and later biographies of *Aytoun* (1867); the *Prince Consort* (5 vols., 1874–80); *Lord Lyndhurst* (1883), and *Princess Alice* (1885). He has also written works on the drama, on *Ancient Classics for English Readers*, etc. He was knighted, K.C.B., in 1880, and the same year was chosen Lord Rector of St. Andrews University. He married Helen Faucit, an actress and author (q. v., *supra*). W.F.J.

MARTIN, LADY THEODORE (HELEN FAUCIT), was born in London on October 11, 1820, and first appeared upon the stage as *Julia* in *The Hunchback* at Covent Garden theater in January, 1836. Her success was instantaneous and great, and she was thereafter identified with Macready's Shakespearian productions, with Bulwer-Lytton's plays, and with Browning's *Blot in the Scutcheon* and *Strafford*, standing easily among the foremost actresses of the time and being equally

esteemed for her virtues of womanhood. After her marriage to Mr. (afterward Sir) Theodore Martin (q. v., *infra*) in 1851, she retired from the stage, and devoted herself to authorship and philanthropy. She died on Oct. 31, 1898. W.F.J.

MARTIN, William Alexander Parsons, an American Presbyterian missionary; born in Livonia, Ind., April 10, 1827. He was graduated from the Indiana State University and in 1847 studied theology at the Presbyterian Theological Seminary, New Albany, Ind. In 1850 he went as a missionary to Ningpo, China, and has spent the greater part of his life there engaged in educational and missionary work. He was professor and president of Tung Wen College from 1868 to 1898, and president of the New Imperial University until 1900, when it was destroyed in the siege of Peking, in which city he was imprisoned with the American legation. In 1902 he was appointed president of the University of Wuchong. Dr. Martin was made a mandarin of the third class in 1885, and of the second class in 1898. In 1860 he received the honorary degree of D.D. from Lafayette College, and was made a LL.D. by the University of the City of New York in 1870. From 1875 to 1878 he edited in Chinese *The Peking Scientific Magazine*, and in 1897–98 edited the *Science Monthly*. He has made many translations into Chinese and has published: *The Chinese: Their Education, Philosophy and Letters* (1881); *Chinese Legends and Other Poems* (1883); *A Cycle of Cathay* (1900); *The Siege of Peking* (1900); *The Lore of Cathay* (1901).

W.M.C.

MARTIN DE MOUSSY, Jeanne Antoine Victor, a French physician and meteorologist; born in Moussy le Vieux, France, June 26, 1810. He was educated at continental universities and took up the science of medicine in Paris in 1838. He served for two years as health commissioner in the French army and in 1841 removed to Montevideo, Uruguay, for medical and meteorological study and observation. He spent four years of travel in South America, making extensive surveys of the Paraguay and Uruguay rivers. Near the city of Montevideo he established from his private purse a meteorological observatory, which he presented to the government. Ill health compelled him to return to France in 1860. He died near Paris, March 26, 1870. He published: *A Geographical and Statistical Description of the Argentine Confederation* (1860). W.M.C.

MARTINEAU, James, theologian; brother of Harriet Martineau; was born at Norwich, England, on April 21, 1805, studied under Dr. Lant Carpenter, and became a Unitarian preacher. In 1841 he was appointed professor of mental and moral philosophy at Manchester New College, and removed to London with that institution, in 1857. In that city he became also pastor of a Unitarian Church. In 1868 he became principal of the college and filled the place with success until his retirement in 1885. He was one of the foremost preachers and theologians of the Unitarian Church, and his abilities were recognized, with honorary degrees, by the universities of Harvard, Edinburgh, and Leyden. He wrote *The Rationale of Religious Inquiry* (1836); *Hymns for the Christian Church and Home* (1840); *Endeavors after the Christian Life* (1843–47); *Studies of Christianity* (1857); *Essays, Philosophical and Theological* (1868); *Hymns of Praise and Prayer* (1874); *Hours of Thought on Sacred Things* (1876–80); *A Study of Spinoza* (1882); *Types of Ethical Theory* (1885); *A Study of Religion, Its Sources and Contents* (1888), and *The Seat of Authority in Religion* (1890). He died on January 11, 1900. W.F.J.

MARTINELLI, Sebastian, archbishop of Ephesus and apostolic delegate to the Catholic Church in America; born in the parish of St. Anna, near Lucca, Italy, Aug. 20, 1848; the brother of the late Cardinal Tommaso Martinelli. He studied for the priesthood and was admitted into the order of St. Augustine in 1871, and from that time until 1886 was professor of theology in the Irish Augustinian College in Rome. In 1889 he was appointed general of the Augustinian order. In 1893 he spent several months in the United States, reorganizing the American branch of his order. In 1896 he was selected by the Pope as delegate and the Vatican representative in America, in succession to Cardinal Satolli.

ARCHBISHOP MARTINELLI.

MARTINEZ, a town and the county seat of Contra Costa County, California. It lies at the south side of the Straits of Carquinez, at the entrance to Suisun Bay, the estuary of the Sacramento and San Joaquin rivers, twenty-two miles northeast of San Francisco, and is reached by the Southern Pacific railroad. It has a large commerce, by land and sea, in grain, fruits, nuts, and other products, and is also the center of considerable mining and quarrying interests. The climate of the region is delightful, and it is a favorite place of residence and a health and pleasure resort. The population of Martinez in 1900 was 1,380. W.F.J.

MARTINEZ-CAMPOS, Arsenio, a Spanish soldier and statesman; born in Segovia, December 13, 1834. He was educated in the military school at Madrid, and entered the army with the rank of lieutenant. He served the Spanish arms in Morocco and Cuba, and against the Carlists. He particularly distinguished himself at Zurugay in June, 1874. He conspired against the republic (for opposition to which he had before been imprisoned) in favor of Alfonso XII, whom he placed on the throne. He finally crushed Don Carlos in March, 1876, and having been made captain-general, was sent against the Cuban rebels. On his return to Spain, in 1879, he became minister of war and president of the council, but resigned the same year. In 1881 he

formed a coalition with Sagasta and retained office till the autumn of 1883. He was then made commander-in-chief of the army in Cuba and then held the post of secretary of war and president of the council of two administrations. He was sent on an expedition to Morocco, and was afterward captain-general of Cuba until he was succeeded by Captain Weyler. He died in Madrid, Spain, September 3, 1900. W.M.C.

MARTINEZ DE LA ROSA, Francisco. See Spain, Vol. XXII, p. 375.

MARTINIQUE and ST. VINCENT, Disasters in. Mont Pelee, a high volcanic mountain overlooking the island of Martinique, about four miles from St. Pierre, the chief city, had been inactive many years, but on the 3d of May, 1902, it began to throw out dense clouds of smoke and steam. Subterranean rumblings were heard and fine gray ashes began to fall. On the 5th of May some lives were lost on the plantation Guerin and a general exodus from St. Pierre was prevented by the military. About 8 A. M., May 8, a great cloud of black ashes and steam shot out from the summit of the mountain, followed immediately by a similar outburst from another crater, about 1,500 feet lower down, in the direction of St. Pierre. The mass of smoke and vapor from the lower crater rushed upon St. Pierre with the speed of a tornado. The gases ignited and an explosion leveled the whole city to the ground. The inhabitants, numbering about 25,000, were killed almost instantly. One man confined in a dungeon and a very few others who were on the seashore were the sole survivors. The total loss of life on Martinique island was officially estimated at 30,000. Another eruption of Mont Pelee occurred Aug. 30 involving a larger portion of territory and causing a total loss of life, including the destruction by a tidal wave of 1,060. Simultaneously with the eruption of Mont Pelee, the volcano known as La Souffrière of St. Vincent became violently active and emitted great quantities of ashes, steam and gas, causing explosions similar to those which destroyed St. Pierre. The lives lost on the plantations and the villages near the mountain were estimated at 1,600.

MARTINSBURG, a town and the capital of Berkeley Co., easternmost West Virginia, on Tuscarora Creek, in the Shenandoah valley, 80 miles W. of Washington, and on the Cumberland Valley and the Baltimore and Ohio railroads. Pop. 1900, 7,564.

MARTIN'S FERRY, a city of Belmont County, southeastern Ohio, nearly opposite Wheeling, West Virginia, on the Ohio River, and on the Wheeling and Lake Erie, the Pittsburg and Cleveland and the Cleveland, Lorain and Wheeling railroads. It contains imported glass-works, said to be the largest in the United States. Population 1900, 7,760.

MARTINSVILLE, a city and the capital of Morgan Co., central Indiana, 31 miles S. W. of Indianapolis, on White River, and on the Pittsburg, Cincinnati, Chicago and St. Louis and the Cleveland, Cincinnati, Chicago and St. Louis railroads. It has a large grain trade, a number of manufactures, some rather famous artesian wells and five sanatoriums. Population 1890, 2,680; 1900, 4,038.

MARTINSVILLE, a village and the capital of Henry County, central southern Virginia, 65 miles S.S.W. of Lynchburg, on the Danville and Western and the Norfolk and Western railroads. It is in a tobacco-growing region, has a large trade in leaf-tobacco and has tobacco factories. Population 1890, 1,850; 1900, 2,384.

MARTIUS YELLOW or MANCHESTER YELLOW. See Tar, Vol. XXIII, p. 64.

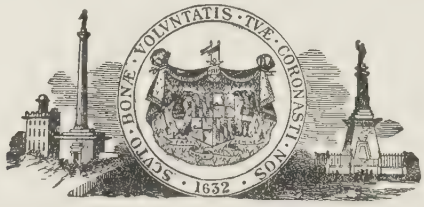
MARTYR, Peter. See Vermigli, Vol. XXIV, p. 180.

MARVEL, Ik. See Mitchell, Donald Grant, in these Supplements.

MARWAR. Same as Jodhpur, Vol. XIII, p. 714.

MARX, Karl. See Socialism, Vol. XXII, p. 221; and Anarchism, in these Supplements.

MARYLAND. According to the eleventh decennial census, Maryland had a population of



STATE SEAL OF MARYLAND.

1,042,390. By the 12th census the population was 1,190,050. Area of the State, 12,210 sq. miles. Chief city, Baltimore, population (1900), 508,957. The density was 120.7 to the square mile, a gain of 15.0 since 1890. The percentage of native-born population was 92.1; that of foreign born, 7.9. The negroes of the state numbered 235,064,—a gain for the ten years preceding, of 19,407. The relative rank among the states held by Maryland in 1880 was twenty-third; and although a gain in population of 11.49 per cent was made during the decade, the rank in 1890 was twenty-seven.

The total number of farms returned by the census of 1900 was 46,012; their average size, 121 acres; the total value of the farms, fences, buildings, and farm machinery and implements was $204,645,407,—a gain, in the ten years, of $3,852,447. Of the farming-land, 1,368,264 acres were devoted to the production of the cereals, on which was raised 31,005,930 bushels. Of this acreage, 48.1 per cent was devoted to corn; 46.4 to wheat; 3.2 to oats; .01 to barley; 1.6 to rye; and 0.6 to buckwheat; 658,010 acres in corn produced 19,766,510 bushels; 634,446 acres in wheat produced 9,671,800 bushels; 44,625 acres in oats produced 1,109,560 bushels; 1,515 acres in barley produced 42,560 bushels; 21,621 acres in rye produced 279,550 bushels; 8,047 acres in buckwheat produced 115,950 bushels; 42,911 acres cultivated in tobacco yielded 24,589,480 pounds; 26,472 acres in Irish potatoes produced 1,991,357 bushels; and 6,469 acres in sweet potatoes yielded 677,848 bushels; in addition to which, the production of molasses, broom corn, and honey was large.

The following table relative to the manufac-

tories of Maryland is condensed from the census returns of 1900:

Industry.	Number.	Capital.	Workers.	Product.
All Industries...	9,880	$163,422,260	108,361	$242,752,990
Textile Manuf...	22	9,351,313	6,286	7,155,722
Tobacco.....	387	3,325,477	4,311	9,896,928
Fertilizers.....	40	7,003,376	1,016	5,481,905
Canned Fruits, etc	271	4,459,660	7,505	11,996,245
Flouring and Grist Mills' products.	407	3,428,996	541	8,035,343
Iron and Steel...	9	2,892,690	2,138	8,739,405
Foundry and Machine shop products	113	6,381,676	4,695	8,443,547
Slaughtering.....	82	1,548,488	597	8,046,359

Other industries of importance were lumber, furniture, and planing-mill products, paper and wood pulp, oyster canning, and shipbuilding.

There were 30,609 persons engaged in the oyster-fishery of the state, the capital invested in the business being $4,518,758, the product 10,282,752 bushels, of a value of $4,467,325; the number of vessels employed was 1,380; the number of boats, 6,759. In the menhaden-fishery, Maryland had an output of the value of $44,360; in the shad and ale-wife-fishery, $755,013. Maryland stood second among the states in the value of the products of all classes of fisheries, the total being $5,564,024.

During the year 1900 there was available in the state treasury the sum of $4,330,419. The disbursements were $3,480,534, leaving a balance of $850,000. The disbursements for the public schools, including teachers' salaries, amounted to nearly three million dollars for the fiscal year 1899. The expenses of the state prisons and the charitable institutions of the state for the two years 1894 and 1895 exceeded $600,000. The total funded debt of Maryland was $6,310,000, as reported by the state comptroller at the close of 1900. The productive assets of the state and the amount of investments to the credit of the sinking funds aggregated $3,424,057, leaving a balance as the net debt of the state of $2,885,269. Overdue credits, and the difference between par and market values of the state assets, would, if available, extinguish the entire debt. The assessable property of the state was of a total value, in 1900, of $616,720,000, a considerable increase over that of the year 1890. The tax rate in 1900 was 17¾ cents on each $100.

The coal-field of Maryland is situated between Savage and Dan's mountains, in Garrett and Allegany counties. The mountain ranges are filled with veins of varying thickness, though little attention is paid to any except the one known as the "fourteen-foot seam." The report of the inspector of mines for 1899 shows that during the year 4,807,396 tons of coal were mined, the number of men employed being over 4,000.

Naturally and climatically, Maryland is divided into the four divisions, eastern, southern, north-central and western. The first, usually called the Eastern Shore, is divided from the remainder of the state by the Chesapeake Bay, and is made up of nine counties, which, with Delaware and two counties of eastern Virginia, form the peninsula, widely known for its peach-growing industries and numerous other profitable pursuits. One of the nine counties, Worcester, touches the Atlantic Ocean, and seven of them touch the Chesapeake Bay. The proximity of ocean and bay greatly modifies the temperature; the products of the soil are many, oysters and fish abundant and cheap and living inexpensive. The five counties that comprise southern Maryland are the principal tobacco-growing ones. The land is somewhat higher and more broken than the Eastern Shore. There is considerable timber-land and some fine river bottoms, which are very productive. Annapolis, the capital, is within this division. Western Maryland is made up of four counties, and includes the coal district. In this narrow portion, parallel ridges of the Alleghanies rise in successively increasing elevations, with fertile and salubrious valleys nestling between. There is a vast area of fine timber-land in this division and mills are numerous. Iron and steel works are many in Allegany County, and the entire section is thrifty and prosperous. Washington County is claimed to have more miles of turnpike than any other county in the United States; and Frederick is the richest, agriculturally, of all the counties of Maryland. North-central Maryland is made up of five counties, the most prominent of which is Baltimore County. Farming, stock-raising, fruit and vegetable packing, and cotton and flouring mills are among the industries of this section of the state, which is in every way prosperous.

There are 240 building and loan associations doing business in the state, whose total assets are $12,465,078, the total membership being 63,398, of whom 18,473 are borrowers. At the date of the last report (1896) the aggregate loans on real estate amounted to $10,133,549.

The State Board of Education reported, for the fiscal year ending Dec. 31, 1899, in the state of Maryland, the following educational statistics: Number of schools in the state, 2,503; number of pupils enrolled, 229,332; total school population, 357,600; the total number of pupils in daily attendance was 132,685; the total number of teachers, 5,127; total receipts from all sources, $2,932,396; total expenditures, for the year, $2,912,527—of which amount the sum of $2,132,952 was for teachers' and superintendents' salaries. Of the denominational institutions of learning in Maryland, Loyola College at Baltimore, Rock Hill College and St. Charles College, both at Ellicott City, and Mount St. Mary's College at Mount St. Mary's, are all controlled by the Catholic Church. The Methodist Episcopal Church has Morgan College at Baltimore; the Presbyterian Church, New Windsor College at New Windsor; and the Methodist Protestant Church controls Western Maryland College at Westminster. St. John's College at

Annapolis is non-sectarian, as is Johns Hopkins University at Baltimore and Washington College at Chestertown.

The charitable, correctional and penal institutions of Maryland are many, and receive liberal appropriations for their maintenance and improvement. Among the principal institutions coming under the head named are the following: Asylum for the Feeble-Minded, Baltimore Orphan Asylum, Baltimore City Hospital, the Deaf and Dumb Asylum, Home of the Friendless, House of Correction, House of Refuge, House of Reformation for Colored Children, Infirmary of Western Maryland, Maryland Hospital for the Insane, Maryland Penitentiary, and St. Mary's Industrial School. In addition to the above-named there are a number of other institutions which receive state support, the appropriations of the legislature aggregating annually in excess of $500,000 for division among forty institutions. The penitentiary was opened in 1811, and from that date to 1894 had received 13,205 convicts. Its capacity is about seven hundred, which is near the average number incarcerated. The structure is on East Madison Street, in the city of Baltimore, and the site and improvements are valued at $1,000,000. The House of Correction, in Anne Arundel County, has a farm of two hundred acres connected with the institution, which proves a source of much profit to the state. The school for the blind is on North Avenue, opposite Calvert Street, in Baltimore. About one hundred pupils attend, the cost for maintenance being close to $30,000 annually. The school for the deaf, located in Frederick City, was incorporated in 1867, and since that time, up to 1896, had more than four hundred pupils under instruction. The school has a capacity for 150 and receives an annual appropriation of $25,000.

The number of newspapers published in Maryland in 1899 was 210. Papers were published in all of the 23 counties and in all of the county capitals. Of the total number of papers, 17 were daily, 2 semiweekly, 152 weekly, 3 semimonthly, 26 monthly, 1 five times a year, and 9 quarterly.

The following is a list of the governors of Maryland, with their terms of office:

John E. Howard.....1789–91	Thomas K. Carroll.....1830–31
George Plater.....1791–93	Daniel Martin.....1831
Thomas Sim Lee.....1793–95	George Howard.....1831–33
John S. Stone.....1795–98	James Thomas.....1833–36
John Henry.....1798–99	Thomas W. Veazey.....1836–39
Benjamin Ogle.....1799–1802	William Grayson.....1839–42
John F. Mercer.....1802–04	Francis Thomas.....1842–45
Robert Bowie.....1804–06	Thomas G. Pratt.....1845–48
Robert Wright.....1806–09	Philip F. Thomas.....1848–51
Edward Lloyd.....1809–11	Enoch L. Lowe.....1851–56
Robert Bowie.....1811–13	Thomas W. Ligon.....1856–58
Levin Winder.....1813–15	Thomas H. Hicks.....1858–62
Charles Ridgeley.....1815–18	Augustus W. Bradford.....1862–65
Charles W. Goldsborough.1818–20	Thomas Swan.....1865–68
Samuel Sprigg.....1820–23	Oden Bowie.....1868–72
Samuel Stevens, Jr.....1823–26	W. Pinkney Whyte.....1872–75
Joseph Kent.....1826–29	James B. Groome.....1875–76
Daniel Martin.....1829–30	John Lee Carroll.....1876–80
William T. Hamilton.....1880–84	Lloyd Lowndes.....1896–1900
Robert M. McLane.....1884–85	John W. Smith.....1900–04
Henry Lloyd.....1885–88	Edwin Warfield.....1904 –
Elihu E. Jackson.....1888–92	
Frank Brown.....1892–96	

See MARYLAND, Vol. XV, p. 609.

Revised by R.C.A. and A.R.R.

MARYSVILLE, a city and the county seat of Yuba County, California, in the north-central part of the state. It stands in the great Sacramento Valley, at the junction of the Feather and Yuba rivers, in the region in which gold was first discovered, and has been a notable place since the early days of the American occupation. It is reached by the Southern Pacific railroad, and in 1900 had a population of 3,497. W.F.J.

MARYSVILLE, a city and the capital of Marshall County, northeastern Kansas, 92 miles W. of St. Joseph, Missouri, on the St. Joseph and Grand Island and the Union Pacific railroads, and on the east bank of Big Blue River. By means of a dam across the river the water-power is utilized by several flour and other mills. It has also cigar factories, a foundry and machine-shop, water-works, an electric-light plant, a national bank and good public schools. Population 1890, 1,913; 1900, 2,006.

MARYSVILLE, a city and the capital of Union County, western central Ohio, 28 miles N.W. of Columbus, on the Toledo and Ohio Central and the Cleveland, Cincinnati, Chicago and St. Louis railroads. It is in an agricultural country, where there are also magnetic and saline springs of medicinal value. Butter-tubs, spokes and other wooden articles are manufactured. Population 1890, 2,810; 1900, 3,048.

MARYVILLE, a city and the capital of Nodaway County, northwestern Missouri, 45 miles N. of St. Joseph, on the One Hundred and Two River, and on the Kansas City, St. Joseph and Council Bluffs and the Omaha and St. Louis railroads. Stock-raising and farming are the chief industries of the surrounding region. Population 1890, 4,037; 1900, 4,577.

MARYVILLE, a manufacturing village and the capital of Blount County, eastern Tennessee, 15 miles S. of Knoxville, on the Knoxville and Augusta railroad. It is the seat of Maryville College, a Presbyterian co-educational institution founded in 1819, which, in 1901, had 15 instructors, 378 students and a library of 12,000 volumes. Freedman's College is also located here. It has manufactories of woolen goods, flour and wooden ware. Population 1900, estimated, 1,750.

MAS-A-FUERA. See JUAN FERNANDEZ, Vol. XIII, pp. 767, 768.

MASCAGNI, PIETRO, Italian composer; born in Leghorn, Dec. 7, 1863; was intended for one of the learned professions, but, showing a tendency toward music at an early age, was sent by an uncle to the Milan Conservatory, but failed to get along with his teachers, and joined a traveling opera company. He became conductor to many such companies, and led a wandering life till he married in 1886 and settled at Cerignola as a teacher of

music. While here, in competition for a prize for a one-act opera, he composed *Cavalleria Rusticana* (1890), the libretto being written by a friend, Menasci. It had an immediate success, and was performed in Italian, German, French, English, and Russian. His later operas are *L'Amico Fritz* (1891), founded on *L'Ami Fritz* of Erckmann-Chatrian; *I Rantzau* (1892), founded on a work by the same authors; *Nerone* (1894); *Ratcliffe* (1895); *Sylvano* (1895); *Zanetto* (1896); and *Iride* (on a Japanese theme, 1898). In July, 1893, he conducted selections from his works before Queen Victoria at Windsor.

MASCART, Éleuthère Élie Nicolas, a French physicist; born in Quarouble, Feb. 20, 1835; educated at the College of Valenciennes and at the École Normal Supérieure. At first he was attached to the École Normal as conservator of the scientific collections, and later became assistant to M. Regnault, whom he succeeded in the chair of physics in 1872. Aside from his collegiate work, he performed many scientific and technical labors for the French government, having had charge of the manufacture of cartridges and chassepots during the Franco-Prussian war, and becoming director of the Weather Bureau in 1878. He took an important part in the Paris exhibitions of 1881 and 1889, and was a member of the electrical congresses held in those years. He was also present at the congress held in Chicago in 1893. The French Academy elected him a member in 1884, and in 1889 he was elected commander of the Legion of Honor. Mascart is especially noted for his works on electricity. Among his writings are *Traité d'Électricité Statique* (1876); *Leçons sur l'Électricité et le Magnetisme* (1882); *Traité d'Optique* (1889–91).

MASCOUTAH, a city of St. Clair County, southwestern Illinois, 43 miles S.W. of St. Louis, on the Louisville and Nashville railroad. It is in a farming district, where coal is plentiful, and contains steam flour-mills. Population 1890, 2,032; 1900, 2,171.

MASENIA or MASENA, a walled town of Africa, capital of Baghirmi, 100 miles S.E. of Lake Chad. It is fairly well constructed, on very rough ground, has a brick palace for the sultan, and is a place of considerable trade, but is decaying on account of its extreme unhealthfulness.

MASÈRES, Francis, an English lawyer and mathematician; born in London, Dec. 15, 1731. He studied at Clare Hall, Cambridge, and at the Temple; graduated from Kingston and was admitted to practice in 1758. He was soon after appointed attorney-general of Quebec. Returning from Canada he became prominent as a barrister and in 1770 carried a measure through the Commons for the establishment of rural savings banks by tax payers. The bill failed to pass the House of Lords, being declared revolutionary. Maseres was appointed general agent to the Protestant settlers of Quebec in 1773 and was made cursitor baron of the Exchequer. He was a voluminous writer on mathematical, historical and political subjects. His work included *A Dessertation on the Negative Signs in Algebra* (1758); *Elements of Plane Trigonometry* (1759); *Algebraic Equations* (1760); a collection of *Scriptures Logarithmici* in six volumes (1770); *The Canadian Freeholder* (1773); and *A Treatise on Life's Annuities* (1783). He died in Reigate, May 19, 1824. W.M.C.

MASHONALAND. See Africa and Rhodesia, in these Supplements.

MASOCH, Leopold von Sacher. See Sacher-Masoch, in these Supplements.

MASON, a city and the capital of Ingham County, southern central Michigan, 12 miles S. of Lansing, on the Michigan Central railroad. It is in a grain, fruit, stock-raising and dairying region, and has manufactories of wagons, road-carts, brick and tiles and also several mills. Population 1890, 1,875; 1900, 1,828.

MASON, a village and the capital of Mason County, southern central Texas, 95 miles W.N.W. of Austin. The nearest railroad station is Llano, 30 miles east, on the Austin and Northwestern railroad. It is in a farming and grazing region. Population 1900, 1,474.

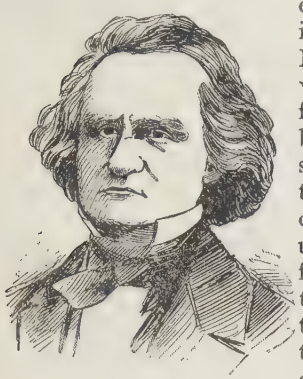
MASON, a post village of Mason County, western West Virginia, on the south bank of the Ohio River, opposite Pomeroy, Ohio, and on the Ohio River railroad. It is a coal mining and shipping point, manufactures nails, and obtains salt from artesian wells. Population 1900, 904.

MASON, Charles. See Mason and Dixon's Line, Vol. XV, p. 619.

MASON, George, an American patriot and statesman; born in Stafford (now Fairfax) County, Va., in 1725. He settled in Mount Vernon and became a neighbor and friend of Washington. He was a member of the first Ohio Company, and was elected to the Virginia assembly in 1755. He was a leader of the opposition to the Stamp Act in Virginia in 1760 and drafted the non-importation resolutions presented to the assembly by Washington. In 1774 he offered 24 resolutions on the questions at issue between Great Britain and the colonies. He was a member of the Virginia committee of safety, and in 1776 sat in the Virginia Constitutional Convention. In the Constitutional Convention at Philadelphia, 1787, he took a leading part in the debates. He joined Patrick Henry in opposing the ratification of the Constitution. He was elected as one of the first United States Senators from Virginia, but declined to serve. He died at his country seat, Gunston Hall, Va., Oct. 17, 1792. W.M.C.

MASON, James Murray, an American statesman; born in Mason's Island, Fairfax County, Va., Nov. 3, 1798. He studied at William and Mary College and was graduated from the University of Pennsylvania in 1818. He then studied law and upon being admitted to the bar in 1820 established a practice at Winchester, Va. He was elected to the state legislature and was a Democratic congressman from Virginia from 1837 to 1839. In 1847 he was elected to the United States Senate, representing Virginia, where he proved a consistent and strong adherent to Southern measures. He was the author of the

fugitive slave law of 1850 and at the outbreak of the Civil War resigned his seat in the Senate to enter the diplomatic service of the Confederacy. He was sent to England with John Slidell as Confederate commissioner but was captured on the steamer *Trent* and taken to Boston where he was confined in Fort Warren until 1862 when he sailed for Europe. From that time until the end of the war he endeavored to secure European recognition of the Confederacy. After the war he lived for a time in Canada, but returned to Virginia in 1869. He died near Alexandria, Va., April 28, 1871. W.M.C.



JAMES M. MASON.

MASON, JEREMIAH, an American lawyer; born in Lebanon, Conn., April 27, 1768. He was graduated from Yale in 1788, was admitted to the bar in 1791, and began to practice law at Westmoreland, N. H. In 1794 he removed to Walpole, N. H., and in 1797 settled at Portsmouth. Among his fellow lawyers were Daniel Webster and Jeremiah Smith. In 1802 Mason was appointed attorney-general of New Hampshire, and in 1813 was elected United States Senator. He took a leading part in the senatorial debates relating to the War of 1812, his speech on the Embargo, delivered in 1814, and that on the Conscription Bill, 1815, being notable. In 1817 he resigned his seat to resume his law practice. Later he served as a member of the New Hampshire legislature. He removed to Boston in 1832 and died there October 14, 1848. W.M.C.

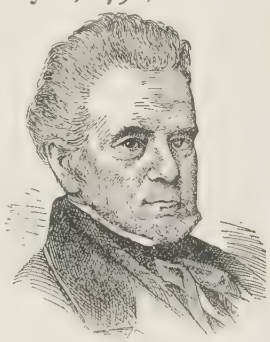
MASON, JOHN (d. 1635), a governor of Newfoundland and vice-admiral of New England. See NEW HAMPSHIRE, Vol. XVII, p. 403.

MASON, JOHN, an American soldier; born in England in 1600. He settled in Dorchester, Mass. with the Warham colonists in 1630, removing to Windsor in 1635 where he assisted in laying the foundation for a new colony. In 1637, having previously been given a military command in Boston, Mason was placed in charge of an expedition of English and Indians against the Pequots, which tribe he annihilated, completing their total destruction in a second movement the following year. During the succeeding 25 years, Mason was a major of the Connecticut forces. He was also a deputy-governor from 1660 to 1670. From 1642 to 1668 he served as a judge of the colonial court. His *Brief History of the Pequot War*, written at the request of the general court, was reprinted by Increase Mather in his *Relation of Trouble by the Indians* (1677). His death occurred at Norwich, Conn., in 1672. W.M.C.

MASON, JOHN YOUNG, an American statesman and diplomat; born in Greensville, Sussex County, Va., April 18, 1799. He was educated at the University of North Carolina, studied law and was admitted to the bar in 1819. He became a judge in State and Federal courts; served several terms in the Virginia assembly; and from 1831 to 1837 was a member of Congress. From 1838 to 1844 he was judge of the United States court for the district of Virginia, and in that year was chosen secretary of the navy in the cabinet of President Tyler. The next year he served temporarily as attorney-general under Polk, but reentered the Navy Department in 1846. President Pierce, in 1853, appointed him minister to France, where he resided until his death, in Paris, Oct. 3, 1859. Mason was one of the signers of the Ostend Manifesto (q.v.). W.M.C.

MASON, SIR JOSIAH, an English philanthropist; born in Kidderminster, February 23, 1795. He began his career selling fruits and cakes on the street, and slowly worked his way up until in 1829 he engaged in making pens and became the largest manufacturer of pens in the world. His early struggles made him desirous of helping those in like circumstances and the generous amounts paid by him for patents were the means of establishing more than one inventor. He erected almshouses and built at Erdington an orphanage which shelters and educates 500 children, founded the Mason Science College at Birmingham and contributed to other benefactions. He was knighted by Queen Victoria in 1782. It is said that he expended $1,500,000 upon the Erdington orphanage and over $2,000,000 on the college in Birmingham. He died in Erdington, England, June 16, 1881. W.M.C.

MASON, LOWELL, musician, was born at Medfield, Mass., on January 8, 1792, and at an early age showed much musical ability, becoming a choir leader and teacher at the age of sixteen. At the age of twenty he went to Savannah, Ga., and there was a choir master and teacher of vocal music. Meantime he edited and compiled a fine collection of church music which was published by the Handel and Haydn Society of Boston. He settled in Boston in 1827, was one of the founders of the Academy of Music in that city, and for many years was one of the leading forces in America for the diffusion of musical knowledge and the cultivation of musical taste. He was the author of several noble and widely used pieces of church music. He amassed one of the finest musical libraries in America, which he bequeathed to Yale College. New York University bestowed upon him in 1855 the first degree of Doctor of Music ever conferred in America. He died at Orange, N. J., on August 11, 1872. W.F.J.



LOWELL MASON.

MASON, OTIS TUFTON, an American ethnologist; born in Eastport, Me., April 15, 1838.

He was graduated at Columbia University in 1861, receiving degrees A.M. in 1862 and Ph.D. in 1879. From 1861 to 1884 he was in charge of the Columbia preparatory school. In 1884 he was appointed curator of ethnology at the United States National Museum. He is a member of various scientific societies in America and Europe. He has published: *Cradles of the American Aborigines* (1889); *Woman's Share in Primitive Culture* (1894); *The Origin of Inventions* (1895); *The Land Problem* (1896); *Primitive Transportation* (1897). W.M.C.

MASON, William, musician, son of Lowell Mason (q. v.), was born in Boston on January 24, 1829, and followed his father's profession as a musician, devoting his attention chiefly to the piano. He studied in Germany under Moscheles, Liszt and other eminent masters, was a favorite pupil of Liszt, and gave concerts with great success throughout Europe. Returning to America, he was the first musician who gave concerts consisting solely of pianoforte music. In co-operation with Theodore Thomas and others he gave musical recitals in New York from 1855 to 1866, and did a great work for the elevation of musical taste. He was one of the finest pianoforte virtuosos and best teachers of his time, and was the author of some standard instruction books and many pieces of music. W.F.J.

MASON CITY, a town of Mason County, central Illinois, 27 miles N. of Springfield, on the Chicago and Alton and the Illinois Central railroads. It is situated in the best corn-growing region of the state. It has flour-mills, brick-yards and grain elevators. Pop. 1900, 1,890.

MASON CITY, a city, and the capital of Cerro Gordo County, central northern Iowa, 142 miles W.N.W. of Dubuque, on the Chicago, Milwaukee and St. Paul, the Iowa Central and the Mason City and Fort Dodge railroads It has flour-mills, limestone quarries, brick and tile works, machine-shops, a cold-storage house and good water-power, and is situated in an agricultural and stock-raising region. Population 1890, 4,007; 1900, 6,746.

MASON-WORK. See Building, Vol. IV, pp. 418–426; Bridges, Vol. IV, pp. 291–293; Rome, Vol. XX, pp. 827–833; Water-Supply, Vol. XXIV, pp. 428–430.

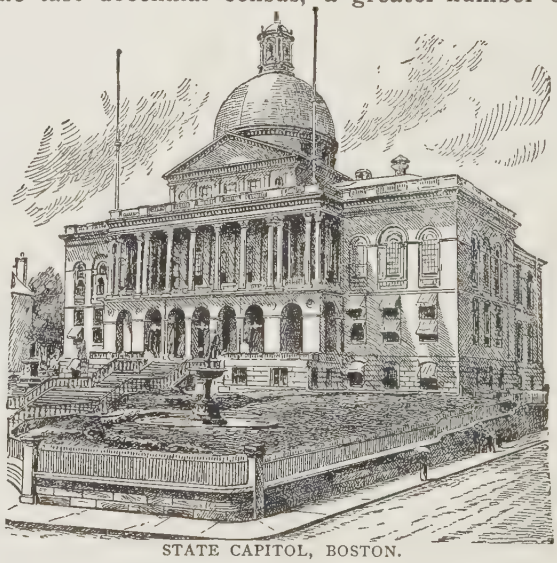
MASPERO, Gaston Camille Charles, Egyptologist; was born in Parison June 24, 1846, studied at the Lyceum of Louis the Great and the Normal School, and in 1874 became professor of Egyptian archæology and philosophy at the College of France. In 1881–86 he was director of the Boulak Museum at Cairo, succeeding Mariette Bey, and founded there a school of Egyptological study. Since 1899 he has been director of excavations in Egypt under the British-Egyptian government. He has received many honorary degrees and other recognitions of his achievements, and is the author of a number of works in English, including *Egyptian Archæology* (1889); *Life in Ancient Egypt and Assyria* (1891); *The Dawn of Civilization* (1894); *The Struggle of the Nations* (1896), and *The Passing of the Empires* (1900). As an explorer and excavator he has opened the pyramids of the kings of the Fifth and Sixth Dynasties, and the burial fields of Sakkara and Dashur, and has discovered other burial places of great interest at Deir el-Bahari, near the entrance to the valley of the Tombs of the Kings, at Ekhmim, 130 miles south of Thebes, and elsewhere, and has contributed much to our knowledge of ancient Egypt. W.F.J.

STATE SEAL OF MASSACHUSETTS.

MASS. See Missal, Vol. XVI, pp. 531–534.

MASSACHUSETTS. See Vol. XV, pp. 619–622, for article of recent date.

The census of 1890 gave the population of the state at 2,238,943, of whom 1,087,709 were males and 1,151,234 were females. The twelfth census taken in 1900, under National authority, showed a material increase, a total of 2,805,346, or a gain of 25.02 per cent for the ten years preceding. The area of the state is 8,040 square miles Massachusetts had, at the time of the taking of the last decennial census, a greater number of



STATE CAPITOL, BOSTON.

females to each 100,000 males than any of the states of the Union, and a greater percentage of urban population than any of the states, with the single exception of Rhode Island. Of the inhabitants, 2,132,623 resided in the 56 cities, constituting 76.0 per cent of the total population. The percentage of native-born citizens was 69.8; of foreign-born, 30.2. The negroes numbered 39,174, an increase of 9,830 since 1890. The density of population was 278.48 to the square mile in 1890, and 348.90 to the square mile, according to the 12th census of 1900. Massachusetts led the states, with Rhode Island excepted, in the density of popu-

lation, and has retained the same relative position since 1800.

Massachusetts is pre-eminently a manufacturing state, and, as is shown by the annual reports of the state bureau of statistics of labor, the industry is increasing constantly. The decennial census returns, which gave the business of 1900, are the last complete statistics on the subject, although the state reports show that the capital invested has increased for every year since up to 1900, and that the number of workers and the value of the products have increased also. The returns for 1900 were as follows:

Business.	Number.	Capital.	Workers.	Product.
All industries...	29,180	$823,264,289	525,308	$1,035,198,989
Boots and shoes (all products)..	916	56,210,228	68,285	151,844,180
Cotton goods...	177	156,289,451	92,515	111,125,175
Foundry and machine-sh'p prod.	825	62,498,989	32,234	56,290,159
Woolen goods...	131	33,196,903	17,717	30,888,104
Leather, tanned and curried....	119	15,317,940	7,010	26,067,714
Paper and wood pulp.....	93	26,692,922	9,061	22,141,461

The number of farms in Massachusetts in 1900 was 37,715, an increase of 3,341 since 1890 (3,147,064 total acres). With the increase in the number of farms, the percentage of improved land has increased also, and the methods of farming have become more scientific. Much attention is given to advanced agriculture throughout the state, members of the board having been chosen from 35 different localities, who, together with the members appointed by the governor and council and 6 *ex officio* members, including the governor, make up the State Board of Agriculture. Among the leading crops raised in 1899 were hay and forage, corn, tobacco, oats, and buckwheat. Owing to the great percentage of urban population, the farmers of Massachusetts find great profit in the culture of the market-garden crops, in dairy products and small fruits.

There has been a constant growth in the assessed value of all property within the state for the purpose of taxation. The returns of the date of May 1, 1895, show a total of $2,542,348,993. The greatest gain in assessed valuation was in real estate, the increase since 1890 being almost three hundred million dollars, while the advance in the value of personal property was but $23,000,000. The total taxes assessed on the valuation of 1895 were $38,084,609, of which 75 per cent was on real estate, the remainder being on polls and personal estate. The number of horses was 208,653; cows, 199,969; sheep, 54,818; neat cattle other than cows, 101,382; and swine, 96,144. The number of dwelling-houses was given at 404,388, an increase of 10,201 within the year preceding, and 53,851 since 1890. The report of the state auditor for 1900 shows the total debts and liabilities of Massachusetts to be $11,704,166; the total resources, which included sinking funds, bonds, cash and lands, amounting to $20,690,474. Interest was paid on the indebtedness for 1895 to the amount of $1,158,559. The total expenses for the year were $18,468,407, of which $7,045,827 was the actual operating expenses of the state government, an amount $58,625 in excess of the sum required for that purpose in 1894.

Massachusetts led all the states in the value of general fisheries, as shown by the decennial census of 1890, the amount of all products being $6,367,033. Almost the entire cod-fishery interests of the United States are centered in Massachusetts, the industry giving employment to more than seven tenths of the total number employed, having capital invested to the extent of more than four fifths of the entire value of apparatus and other property, and returning $3,498,812 of the $4,262,334 which represented the value of the entire business. In lobster fishery Massachusetts stands second to Maine only, and produces about one fifth of the catch of the eight states engaged in the work. Massachusetts does about five sixths of the entire mackerel fishery of the United States, Connecticut, Maine and Rhode Island contributing the remainder. Other branches of this important industry are menhaden, sea-herring, shad and alewife fishery. Whale fishery was reported from California, Connecticut, New York, Washington and Massachusetts in the census of 1890, the reports showing that Massachusetts had more than one half of the total number of persons employed in the business, more than one half of the capital invested, and produced more than one half of the value of the products. For the year named the general value of all fisheries reached the sum of $5,234,968.

Massachusetts is famed for its product of granite, the annual value of the stone mined exceeding one fifth of the output of the quarries of the United States. Limestone and sandstone also found, and a limited amount of coal is mined.

The report of the railroad commissioner for the year 1900 gives the total mileage of main and branch lines as 2,111.79. The second, third and fourth track and side track make the total length of railroad track within the state 4,228.160 miles, an increase over 1894 of 17.965 miles. Fifty corporations owned and operated the railroads of the state, which reported gross incomes from operation $68,154,906, an increase over the preceding year of $4,026,483. The gross operating expenses were $46,446,304, to which other expenses and charges were added to produce a total expenditure of $74,626,252. This, deducted from the total income from all sources, left a deficit of $38,546, that of the preceding year having been $1,823,561.

The opening of 1896 found the National Guard of the state numbering 422 officers and 5,247 enlisted men. The total expenses of the military of the state for 1895 were $262,100.

In 1899, 626,898 children of school age, 5 to 15 years, were enumerated, an increase of 218,573 over the enumeration of 1898. The number enrolled in the schools of the state was 472,593, an

increase over the preceding year of 41,984. In 1899 the number in attendance upon the schools was 367,047, an increase of 7,285 over 1898. The average duration per year of the schools of the state was 9 months and 6 days. The total expended for the maintenance of the schools was $13,661,356, an average of $36.07 for each child of school age in the state. The total number of teachers employed in 1899 was 13,400. In addition to the ordinary schools, 54 towns maintained evening schools to the number of 747, at which 29,268 pupils gave an average attendance of 15,371. These schools were kept up by an expenditure of $176,188. Two hundred and thirty towns had 252 high-schools, in which 32,752 pupils were enrolled, an increase of 2,212 over 1894, and making the ratio of the high-school enrollment about 8 per cent of the general enrollment. There were 341 private schools, at which 59,204 pupils were in attendance, and 59 incorporated academies, with 5,484 pupils. Normal schools were maintained at the following places: Bridgewater, 256 students, 80 graduates; Framingham, 138 students, 43 graduates; Salem, 221 students, 56 graduates; Westfield, 124 students, 40 graduates; Worcester, 215 students, 42 graduates; Normal Art School, Boston, 268 students, 28 graduates. Many manual-training schools are maintained in different cities of the state, the majority of which have been established since 1890. The institutions of higher education are numerous and of a high order. They include: Harvard College, Williams College, Amherst College, Mt. Holyoke College, the College of the Holy Cross, at Worcester, Tufts College, Massachusetts Institute of Technology, Boston College, Massachusetts Agricultural College, Worcester Polytechnic Institute, Boston University, Wellesley College, Smith College, at Northampton, and Clark University. The majority of these will be found separately and fully described under their appropriate titles in these Supplements.

In 1895 there were confined in the state prison, at Boston, 683 prisoners as an average, whose services yielded the state a net profit of $28,903. The cost of their support was $138,475, making the actual cost to the state for the year $109,571. Sept. 30, 1895, there were 5,007 prisoners in the different jails of the state, 1,011 in the State Reformatory, 1,677 in the House of Industry, and 574 at the State Farm.

Below is given a list of the hospitals for the insane, with the number of patients, Sept. 30, 1895, and the cost of maintenance for the year:

Worcester Hospital	961	$196,734
Worcester Asylum	447	76,026
Taunton Hospital	846	144,780
Northampton Hospital	546	116,611
Danvers Hospital	948	175,454
Westborough Hospital	567	109,609
Total for the six institutions	4,315	$819,217

Other asylums, municipal and private, maintain patients at the expense of the state, the number at the date of the above report being 1,448. Eight hundred and three patients were confined in town almshouses, and 202 boarded in private families, making the total number of insane kept at the expense of the state, 6,768. In addition to the institutions named above, there was appropriated in 1892 the sum of $1,000,000 for the construction of an asylum at Medfield, which was occupied first in the summer of 1896. In 1895 the legislature authorized the construction of a separate asylum for epileptics, to be located at Monson. There is sustained by the state an asylum for dipsomaniacs and inebriates, at Foxborough, at which 129 patients were under treatment at the date of the above report, the cost to maintain them for the year amounting to $45,774. The School for the Feeble-minded, at Waltham, had 423 inmates, the annual expenses being $70,012. The hospital cottage for children, at Baldwinville, reported 105 children and the expenses for the year $27,797. The State Farm had paupers, prisoners and insane to the number of 953, whose maintenance cost $98,502. The State Almshouse, with 1,064 inmates, required the sum of $208,612 for the expenses of the year. The State Industrial School for Girls, with 111 inmates, expended during the year $48,222. The Lyman School for Boys, with 264 inmates, required $58,965 for the expenses of the year.

Other charitable institutions are the Eye and Ear Infirmary, General Hospital and Homœopathic Hospital, all in Boston; the Hospital for Consumptives; the School for the Blind; the Soldiers' Home, in Chelsea; the Reformatory, in Concord; the Reformatory Prison for Women, in Sherborn; and many county and municipal institutions, maintained either wholly or in part at public expense.

Fifty-two fire-insurance companies, whose home offices were in Massachusetts, reported assets in 1896 of $9,869,622; eight manufacturers' mutual companies had assets of $14,708,907; two mutual marine companies had $527,269; and seven joint-stock companies had $9,199,631. The insurance companies of other states doing business in Massachusetts reported assets to the amount of $175,967,934. The life-insurance companies of the state numbered five, with gross assets amounting to $68,056,187. The companies of other states doing business in Massachusetts reported assets of $1,038,554,212. Nine assessment life-insurance companies of the state reported expenditures for the year of $2,579,411; the companies from without the state, $9,858,725.

In October, 1900, there were 119 co-operative savings banks in Massachusetts, with assets of $20,552,667; 187 savings banks, with assets of $466,426,772; 34 trust companies, with assets of $129,043,157; and 246 national banks had an aggregate capital of $79,000,000.

Five hundred and eight public libraries, having more than one thousand volumes each, reported above five million volumes. In 308 towns of the state, libraries are free to the public. The college libraries of Massachusetts are among the finest in the United States. (See BOSTON PUBLIC LIBRARY, in these Supplements.)

The church statistics of Massachusetts are as

follows: All bodies, 2,547; edifices, 2,458; seating capacity, 1,102,772; value of church property, $46,835,014; members, 942,751. The membership of the leading denominations is as follows: All Baptist bodies, 340; Roman Catholic, 381; Congregationalists, 559; all Methodist bodies, 422; Protestant Episcopal, 168; Unitarians, 189; Spiritualists, 61.

Newspapers are published in 216 towns of Massachusetts and in all of the 19 county seats. Jan. 1, 1899, there were 711 papers published, 80 being daily, 6 semiweekly, 446 weekly, 8 fortnightly, 12 semimonthly, 128 monthly, 1 every six weeks, 1 bimonthly, 1 five times a year, and 28 quarterly.

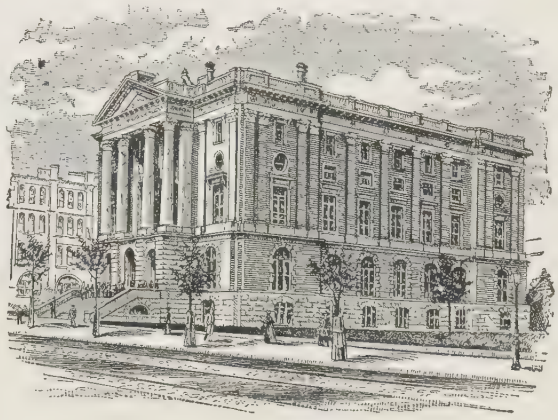
The following Massachusetts cities showed a population in excess of 30,000 by the census of 1900. The population in 1890 is also given for comparison:

City.	1900.	1890.
Boston	560,892	496,920
Brockton	40,063	33,165
Cambridge	91,886	81,643
Chelsea	34,072	31,264
Fall River	104,863	89,203
Haverhill	37,175	30,200
Holyoke	45,712	40,322
Lawrence	62,559	52,164
Lowell	94,869	84,367
Lynn	68,513	62,354
New Bedford	62,442	55,251
Salem	35,956	34,473
Somerville	61,643	52,200
Springfield	62,059	51,522
Worcester	118,421	98,767

The following is a list of the governors of Massachusetts since the adoption of the constitution in 1780, with their respective terms of office:

John Hancock	1780–85
James Bowdoin	1785–87
John Hancock	1787–93
Samuel Adams	1793–97
Increase Sumner	1797–99
Moses Gill	1799–1800
Caleb Strong	1800–07
James Sullivan	1807–08
Levi Lincoln	1808–09
Christopher Gore	1809–10
Elbridge Gerry	1810–12
Caleb Strong	1812–16
John Brooks	1816–23
William Eustis	1823–25
Marcus Morton	1825
Levi Lincoln	1825–34
John Davis	1834–35
Samuel T. Armstrong	1835–36
Edward Everett	1836–40
Marcus Morton	1840–41
John Davis	1841–43
Marcus Morton	1843–44
George N. Briggs	1844–51
George S. Boutwell	1851–53
John H. Clifford	1853–54
Emory Washburn	1854–55
Henry J. Gardner	1855–58
Nathaniel P. Banks	1858–61
John A. Andrew	1861–66
Alexander H. Bullock	1866–69
William Claflin	1869–72
William B. Washburn	1872–74
Thomas Talbot	1874–75
Wm. Gaston	1875–76
Alex. H. Rice	1876–79
Thomas Talbot	1879–80
John D. Long	1880–83
Benjamin F. Butler	1883–84
George D. Robinson	1884–87
Oliver Ames	1887–90
John Q. A. Brackett	1890–91
William E. Russell	1891–94
Fred. T. Greenhalge	1894–97
Roger Wolcott	1897–1900
W. M. Crane	1900–03
John L. Bates	1903–05
William L. Douglas	1905–

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, a co-educational institution, located in Boston, Massachusetts, for giving instruction in manual training and in the higher branches of mechanics and kindred sciences. It was organized in 1861, advantage being taken of the Con-



MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

gressional grant to technical colleges. In 1901 there were 1,430 students in attendance, with 139 instructors, and a library of about fifty-four thousand volumes. Its productive funds in 1900 amounted to $1,784,234, and its total income was $347,132.

MASSAGETÆ. See Herat, Vol. XI, p. 638; and Cyrus, Vol. VI, p. 664.

MASSASAUGA, the Indian name of a small black rattlesnake of the genus *Crotalophorus* or *Caudisona*. It resembles the true rattlesnake *Crotalus*, but differs in that the rattles are poorly developed and the head is covered with plates. It is very poisonous, and is feared even more than the true rattlesnake. The reptile inhabits the central portions of the United States, and is very common in the burrows of prairie-dogs and other animals.

MASSASOIT, an American Indian, chief or sachem of the Wampanoags; born in Massachusetts in 1580. His dominion included all the southern part of Massachusetts and his tribe once estimated at 30,000, had been reduced by disease and war to less than 400 at the time the pilgrims landed at Plymouth. In March, 1621, Massasoit appeared before the Plymouth colony with sixty of his more prominent warriors, for the purpose of forming a friendly league with the white men. Although the tribe were reputed to be cruel and treacherous, the friendly greeting of Massasoit so favorably impressed Governor Carver and the Plymouth government officials, that after the necessary formalities were concluded, he formed in behalf of the colony at Plymouth a treaty of peace and mutual protection with the Wampanoags, which for nearly half a century was kept by both parties. The friendly disposition of Massasoit toward the colonists never relaxed. He died near Warren, R. I., in 1655, being succeeded as sachem of the tribe by his son Alexander.

W.M.C.

MASSÉ, Félix Maria Victor, a French

musician and composer; born in Lorient, March 7, 1822. He studied at the Conservatoire of Paris, and carried off the grand prize for musical composition in 1844. He composed various romances, melodies, and operas, which were highly successful on the French stage. In 1860, he was made chief of the Paris opera and in 1861 was decorated with the Legion of Honor. In 1863 he received a pension of 2,400 francs. In 1866 he was nominated professor of composition at the Conservatoire, in place of M. Le Vorgue. His compositions include *The Seasons* and *Paul and Virginia*. He died in Paris, July 5, 1884. W.M.C.

MASSENET, Jules Émile Frédéric, a French composer; born in Montaud, May 12, 1842; studied at the Paris Conservatoire, obtained the first prize for pianoforte in 1859, the first for fugue, and the Prix de Rome for his cantata, *David Rizzio*, in 1863. He traveled through Italy and Germany, and made his *début* at the Opéra Comique, Paris, in 1868, with *La Grand' Tante*. In 1878 he became professor of composition at the Conservatoire, and a member of the Académie des Beaux-Arts. He composed *Esclarmonde*, a romantic opera, which ran 100 nights (1889), and other noted works, including *Don César de Bazan* (1872); the orchestral suites *Scènes Pittoresques* (1872) and *Les Erinnyes* (1873); *Eve*, a cantata (1875); *Le Roi de Lahore* (1877); *La Vierge* (oratorio, 1880); *Hérodiade* (1881); *Manon* (1884); *Le Cid* (1885); *Le Carillon* (ballet); *Griseldis* (1898); *Cinderella* (1898); and *Sapho;* also some entr' actes and stage music for Sardou's *Théodora* (1884) and *The Crocodile* (1886).

MASSEY, Gerald, an English poet; born of humble parentage, at Tring, Hertfordshire, May 29, 1828. At eight years of age he was working twelve hours a day in a silk manufactory, and later obtained employment in a straw-braiding establishment. At the age of fifteen he went to London and found work as an errand-boy, and at twenty-one he became editor of the *Spirit of Freedom*. The following year he was one of the secretaries of the "Christian Socialists," and a personal friend of Charles Kingsley and F. D. Maurice. In 1854 he published *The Ballad of Babe Christabel and Other Poems*, which entered its fifth edition at the end of the year. He then joined the staff of the *Athenæum*, and for ten years wrote a considerable number of its reviews. For several years he wrote on literary subjects, in the *Quarterly Review*. As early as 1852 Mr. Massey began to take a great interest in mesmerism, spiritualism and kindred subjects, and delivered many lectures on such matters, both in London and abroad. He lectured all through North America, Australia and the colonies, twice making the trip from New York to San Francisco. He published several volumes of poems and some prose works, among the former, besides those already mentioned, being *Robert Burns and Other Lyrics* (1859); *Havelock's March and Other Poems* (1861); *A Tale of Eternity and Other Poems* (1870); *My Lyrical Life* (1889); and among the latter, *Concerning Spiritualism* (1872); *The Secret Drama of Shakespeare's Sonnets* (1864–88). He also made numerous contributions to English and American periodical literature. *Revised by* R.W.C.

MASSICOT. See Mineralogy, Vol. XVI, p. 401.

MASSILLON, a city of northeastern Ohio. It is the center of the richest wheat-belt in Ohio, and its coal-mining interests have a cash capital of $1,000,000 and employ several thousand men. Lately established are large stationary engine works, iron-bridge works and threshing-machine works. It is supplied with water, sewer system, electric lights, street-railways and gas. Population 1900, 11,944. See Massillon, Vol. XV, p. 623.

MASSON, David, a British author and educator; born in Aberdeen, December 2, 1822. He was educated first at Marischal College there, and afterward at the University of Edinburgh. He began his literary career in 1841, as the editor of a local newspaper. He then went to London, where he contributed to the *North British Review*, the *British Quarterly Review*, the *Dublin University Magazine*, and other publications. He was appointed, in 1852, to the professorship of English language and literature in University College, London, and in 1858 became editor of *Macmillan's Magazine*, a post which he retained until 1868. He was then made professor of rhetoric and English literature in Edinburgh University, which position he resigned in 1895. His publications include a school *History of Rome*, (1848); an account of the *British Museum* (1848); and two small volumes on *Mediæval History* (1856), and *Modern History* (1856). In the latter year he also issued *Essays, Biographical and Critical, Chiefly on the English Poets*. In 1859 came a volume on *British Novelists and Their Style; being a Critical Sketch of the History of British Prose and Fiction*. In 1859 he also issued the first volume of *The Life of Milton and History of His Time*. This great work, which added his name to the short list of standard biographers, occupied twenty years of his life. The second volume followed in 1871, after a long interval of years, the third volume appearing in 1873, the fourth and fifth in 1877 and the sixth and last in 1880. In 1865 he published *Recent English Philosophy*. In 1873 he appeared again as a biographer, writing *Drummond of Hawthornden: the Story of His Life and Writings*. In 1874 he published *The Three Devils: Luther's, Milton's and Goethe's*, and in 1878, *De Quincey*. In 1892 he brought out *Edinburgh Sketches* and *Memoirs*. In 1893 he was appointed Histographer-Royal for Scotland. He contributed the article Milton to this Encyclopædia. W.M.C.

MASSOWAH, a town. In 1865 it passed from Turkey into the hands of Egypt; in 1885 Italy, with the help of England, taking advantage of the Mahdist troubles of Egypt, seized the town, and has made it her chief port and settlement in her protectorate of Eritrea. The climate is unhealthful, dysentery and fever being prevalent. Pop. (1899), 7,775, mostly Arabs; of the number 600 are Europeans. See Massowah, XV, p. 626.

MAST. See SAIL, Vol. XXI, p. 161; and SEAMANSHIP, Vol. XXI, pp. 621, 622.

MASTABA. See PYRAMID, Vol. XX, p. 128.

MASTACEMBELIDÆ. See ICHTHYOLOGY, Vol. XII, p. 729.

MASTER, a title of authority applied to various functionaries. These include: MASTER OF A SHIP. In the American and English navies the rank of master was given to the navigator or sailing-master of a vessel. An act of Congress of 1883 changed the title in the American navy to that of lieutenant (junior grade). In the British navy this officer is now termed a navigating lieutenant, or, on line-of-battle ships and flagships, a staff commander. (See *Navigating Officer*, under NAVY, Vol. XVII, p. 301.) In the merchant service of both countries the captain of a vessel is more technically and correctly termed the master.—MASTERS AT COMMON LAW, and masters in chancery and masters of the crown office are officers of the English system of judicature, whose principal duties are the supervision of interlocutory motions and minor matters in actions and suits, the entry and recording of judgments and the taxation of bills of costs. See JUDICATURE, Vol. XIII, pp. 774, 775, and CHANCERY, Vol. V, p. 338.—MASTERS IN CHANCERY in the state courts of America are practically official referees, as to whose duties see REFEREE, Vol XX, p. 332. As to the powers and duties of a MASTER ON LUNACY, see INSANITY, Vol. XIII, p. 119. A high judicial officer in England bears the title of Master of the Rolls. His functions are fully described under ROLLS, MASTER OF, Vol. XX, p. 643.—In the royal household are to be found the Master of the Ceremonies (see ROYAL HOUSEHOLD, Vol. XXI, p. 43, note) and the Master of the Horse, whose duties are described in the same article, Vol. XXI, p. 43. The Master of the Faculties is an official of the archbishop of Canterbury. See ARCHBISHOP, Vol. II, p. 323. The principal use of the word, however, is twofold—first, to describe the relationship of master and servant; as to which, see MASTER AND SERVANT, Vol. XV, p. 627; and LABOR AND LABOR LAWS, Vol. XIV, pp. 166–175; and, second, to describe one of the degrees conferred by a university; see UNIVERSITIES, Vol. XXIII, pp. 890–911.

MASTER AND SERVANT. See MASTER AND SERVANT, Vol. XV, pp. 620, 621; and EMPLOYER'S LIABILITY, and MASTERY, in these Supplements.

MASTERS, MAXWELL TYLDEN, an English botanist; born at Canterbury, April 15, 1833; educated at King's College, London, practiced medicine for some years; was lecturer on botany at St. George's Hospital from 1865 to 1868; principal editor of the *Gardeners' Chronicle* in 1865; was botanical examiner in the University of London; fellow of the Royal Linnæan and Royal Horticultural Societies, and an associate of King's College. His works include *Vegetable Teratology* (1869); *Botany for Beginners;* and *Plant Life* which have been translated into several languages; also monographs and contributions to scientific journals and this ENCYCLOPÆDIA.

MASTERSINGERS OR MEISTERSANGER. See GERMANY, Vol. X, p. 471; and MUSIC, Vol. XVII, p. 91.

MASTICATION. See NUTRITION, Vol. XVII, p. 689.

MASTIFF. See DOG, Vol. VII, p. 286.

MAT OR MAIT. See EGYPT, Vol. VII, p. 622.

MATABELES. See RHODESIA, in these Supplements.

MATAGALPA. See NICARAGUA, Vol. XVII, p. 490.

MATAMATA. See TORTOISE, Vol. XXIII, p. 488.

MATAMOROS, MARIANO, a Mexican patriot and soldier; born in Mexico about 1770. With Morelos and Hidalgo he was a parish priest in Jantetelco, and in 1811 joined Hidalgo in the first rebellion against Spanish rule in Mexico. He was made a colonel and then a general, being known as "The Right Arm of Morelos." He attained the rank of lieutenant-general, April 19, 1813, on which date he defeated Lambrini at Tonalo. In October of the same year he won the celebrated victory of San Augustin del Palmar. Matamoros displayed remarkable military genius and the revolution would have proved successful if his advice had been taken by Morelos. The latter was repulsed at Valladolid, Dec. 23, 1813, and at Puruaran, Jan 14, 1814. In the latter engagement Matamoros was taken prisoner. Morelos offered two hundred prisoners in exchange for him but the offer was refused and Matamoros was publicly executed in the Valladolid market-place, Feb. 3, 1814. His remains rest in the Cathedral in the City of Mexico. Matamoros City was named in his honor. W.M.C.

MATANZAS OR SAN CARLO DE MATANZAS, a city and seaport of Cuba, capital of the province of the same name, situated on the north coast about fifty-two miles east of Havana. Population of the province in 1900 was 202,444. On April 27, 1898, the forts on shore were destroyed by bombardment from the *New York*, *Puritan*, and *Cincinnati*. On May 6th the *Dupont* and *Hornet* destroyed some Spanish blockhouses and broke up attempts to refortify the place. (See also MATANZAS, Vol. XV, p. 631; UNITED STATES, in these Supplements, Vol. XXIX, p. 357.)

MATERIAL BASIS OF HEREDITY, THE. See HEREDITY, in these Supplements.

MATERIALISM. See STOICS, Vol. XXII, pp. 591 *et seq.;* for reconciliation of Ideality and, see LOTZE, Vol. XV, p. 14; and for rise of sense of, see PSYCHOLOGY, Vol. XX, pp. 59–62.

MATERIA MEDICA, same as PHARMACOPŒIA; q.v., Vol. XVIII, pp. 744–745.

MATHER, FREDERIC GREGORY, journalist, was born at Cleveland, Ohio, on August 11, 1844 and was graduated from Dartmouth College in 1867. He was editor of *The Binghamton Republican*, a writer on *The Albany Evening Journal*, and has been a correspondent for various newspapers, chiefly at Albany, N. Y. He has written many magazine articles. W.F.J.

MATHER, INCREASE (1639–1723). See MATHER, COTTON, Vol. XV, p. 637.

MATHER, Richard Henry, educator, was born at Binghamton, N. Y., on February 12, 1835, was graduated at Amherst College in 1857, and was a member of the Amherst faculty, as professor of Greek, lecturer on art, etc., from 1859 to the end of his life. He secured for Amherst a notable collection of plaster casts of sculpture. He died on April 16, 1890. W.F.J.

MATHERS, Helen Buckingham. See Reeves, Mrs. Henry, in these Supplements.

MATHESON, George, a British clergyman and author; born in Glasgow, Scotland, March 27, 1842. He was educated at the Academy and University of Glasgow. Though he had lost his sight early in life, his career at college was brilliant. He was ordained a minister in the Church of Scotland in 1866. He was appointed assistant to Dr. Macduff of Sandyford Church, Glasgow, in 1867; minister of Innellan in 1868; lecturer for 1881, and one of St. Giles's lecturers for 1882. In 1886 he was transferred to the parish of St. Bernard's, Edinburgh. His publications include *Aids to the Study of German Theology* (1877); *Natural Elements of Revealed Theology* (Baird lecture, 1882); *Confusianism* (from the Giles lecture, 1882); *Can the Old Faith Live with the New?* (1885); *Sacred Songs* (1890); *The Psalmist and the Scientist* (1892); *Sidelights from Patmos* (1897); *The Sceptre without a Sword* (1901); *The Representative Men of the Bible* (1902). In 1890 he was made a fellow of the Royal Society of Edinburgh. W.M.C.

MATHEWS, William Smythe Babcock, musician; born in Loudon, N. H., May 8, 1837; was educated in New Hampshire, and received his musical training in Lowell and Boston, Mass. In 1852 he became instructor of music at the Appleton Academy, Mt. Vernon, N. H. In 1860 he removed to Macon, Ga., and was there professor of music in the Wesleyan Female College, and later taught music in Marion, Ala. In 1867–93 he was organist of the Centenary Methodist Church, Chicago, Ill. In 1891 he became editor of the magazine, *Music*, merged in the *Philharmonic* in 1903. His publications include *Emerson Organ Method; How to Understand Music; First Lessons in Phrasing; Primer of Musical Forms; Music and Its Ideals; Popular History of Music; The Great in Music; Dictionary of Musical Terms; The Masters and Their Music*, etc. G.J.H.

MATHILDE, Princess Mathilde Lætitia Wilhelmine Bonaparte, daughter of the ex-King Jerome and Princess Catherine of Würtemberg and cousin of Napoleon III, was born in Trieste, May 27, 1820, and married at Florence, Oct. 10, 1841, to the Russian, Prince Anatole Demidoff. This union was not happy, and in 1845 they separated by mutual consent, her husband being compelled by the Czar to pay her an annuity of $154,000. From 1849 till the marriage of Napoleon III, she did the honors at the palace of the President, and on the re-establishment of the empire was comprised among the members of the imperial family of France, and received the title of highness. After the Franco-Prussian War she again took up her residence in Paris, and became famous for her artistic and literary receptions. Being an accomplished artist, she exhibited at the Salôn de Peinture upon several occasions, and in 1861 received honorable mention. Died Jan. 2, 1904.

MATHURA. See Muttra, Vol. XVII, p. 120.

MATINS. See Breviary, Vol. IV, p. 235.

MATTAWA, a river of Nippissing district, Ontario, Canada, rising in Trout Lake, near Lake Nippissing, and flowing almost directly east into the Ottawa River, at the town of Mattawa. It abounds in fish. It has a course of fifty miles through a picturesque series of lakes and rapids.

MATTEAWAN, a village of Dutchess County, New York, in the eastern part of the state, on the east side of the Hudson River, fifty miles north of New York. It is near the New York Central and Hudson River railroad, and on the New England and the Newburg, Dutchess County and Connecticut railroads, and is the seat of a State Asylum for the Insane. Its population in 1900 was 5,807. W.F.J.

MATTERHORN, Switzerland, a peak of the Apennine Alps in the Canton of Valais, at the boundary with Piedmont, Italy, generally known by its German name, but called by the French Mont Cervin, and by the Italians Monte Silvio. Its monumental point rises to a height of 14,771 feet. The ascent of the Matterhorn is usually made from Zermatt, which is reached by a branch line up the Nicolai Thal from Viège or Visp on the Rhone Valley railroad. C.L.S.

MATTHEWS, Sir Henry. See Llandaff, Viscount, in these Supplements.

MATTHEWS, James Brander, an American author; born in New Orleans, La., Feb. 21, 1852. He was graduated from Columbia in 1871, and from the Columbia Law School in 1873. In the latter year he was admitted to the New York bar. In 1892 he became professor of literature at Columbia and in 1898 professor of dramatic literature. He is well known as a critic and essayist and is an authority on the drama. His published works include *French Dramatists of the Nineteenth Century* (1881); *In Partnership* (with H. C. Bunner; 1884); *A Secret of the Sea and Other Stories* (1886); *Pen and Ink* (1888); *American Literature* (1896); *Outlines in Local Color* (1897); *A Confident To-morrow* (1898); *The Action and the Word* (1900); *The Historical Novel, and Other Essays* (1901); *Parts of Speech: Essays in English* (1901); *The Development of the Drama* (1902). W.M.C.

JAMES B. MATTHEWS.

MATTHEWS, Stanley, an American soldier and jurist; born in Cincinnati, O., July 21, 1824. He was graduated at Kenyon (Ohio) Col-

lege in 1840; studied law and was admitted to the bar in 1842. From 1846 to 1849 he was editor of the Cincinnati *Herald*. He was a member of the state legislature, was elected county judge in Hanover County and in 1858 was appointed United States district attorney for the southern district of Ohio. At the outbreak of the Civil War in 1861, he entered the volunteer service and was commissioned lieutenant-colonel. He was made a colonel while serving with the Army of the Cumberland. In 1863 he resigned to accept the seat of judge of the superior court of Cincinnati. He was elected United States Senator in 1877, and in 1881 he was appointed by President Garfield a justice of the Supreme Court of the United States. He died in Washington, March 22, 1889. W.M.C.

STANLEY MATTHEWS.

MATTO GROSSO ("dense forest"), an inland state of Brazil, bordering on Bolivia. Within this vast territory several great rivers rise, including the Madeira and Paraguay. The vegetation is generally scanty, high trees and rich vegetation being confined to the river valleys. The gold and diamonds of Matto Grosso have been exhausted, and agriculture (insufficient for the wants of the state) and cattle-raising are the principal industries. The former capital, Matto Grosso, decayed with the gold-mining industry, and is now a fever-haunted place with 1,500 inhabitants. By the census of 1890 the population of the state was 92,827; its area 532,708 square miles. It is the most sparsely settled state of Brazil. See also BRAZIL, Vol. IV, pp. 210–213.

MATTOON, a city of Coles County, Illinois, in the eastern part of the state. It is reached by the Cleveland, Cincinnati, Chicago and St. Louis, the Peoria, Decatur and Evansville and the Illinois Central railroads, and had in 1900 a population of 9,622. See Vol. XV, page 641. W.F.J.

MAUCH CHUNK, a borough and the county seat of Carbon County, Pennsylvania, in the central-eastern part of the state. It is most picturesquely situated between the Lehigh River and Mauch Chunk Mountain, northwest of the Blue Ridge, and its fine scenery has made it a favorite resort of tourists. It is in the anthracite coal region, and is an important center of that industry. The place is reached by the Lehigh Valley and New Jersey Central railroads, and had in 1900 a population of 4,029. W.F.J.

MAUDSLEY, HENRY, physician; was born in the West Riding of Yorkshire, England, on February 5, 1835, and was educated at the University College, London. He was graduated in medicine in 1857, and devoted his attention chiefly to mental disorders. For a time he was physician to the Manchester Royal Lunatic Asylum, but in 1862 returned to London to resume consulting practice, and from 1869 to 1879 was professor of medical jurisprudence at University College. His published works include *Responsibility in Mental Disease* (1874); *Physiology of Mind* (1876); *Pathology of Mind* (1879); *Body and Will* (1883); *Natural Causes and Supernatural Seemings* (1886), and *Life in Mind and Conduct* (1902). He was for some years editor of the *Journal of Mental Science*, and in 1870 was Gulstonian lecturer. W.F.J.

MAUI. See HAWAII, Vol. XI, p. 475.

MAULE, a river of Chile, rising in the Andes near lat. 36° S., and flowing westward to the Pacific. Length 150 miles, navigable for a third of the distance. Discharges 9,800 cubic feet of water per second. It is spanned by a five-span bridge, 335 feet high and 1,419 feet long. It is the northern boundary of the province of MAULE, containing 2,930 square miles of territory, and, in 1895, 119,791 inhabitants. See also CHILE, Vol. V, pp. 536, 537.

MAUMEE, a village of Lucas County, northwestern Ohio, nine miles S.W. of Toledo, on the Toledo, St. Louis and Kansas City and the Wabash railroads, on the Maumee River and on the wabash canal. It is in a truck-gardening and farming region, and has manufactories of reapers, glass, woolen goods, flour, paper and lumber. Population, 1890, 1,645; 1900, 1,856.

MAUMEE RIVER, a considerable stream formed by the junction of two smaller ones at Fort Wayne, Indiana, and flowing thence northeasterly across the northwestern corner of Ohio to the western end of Lake Erie at Toledo. W.F.J.

MAUNA LOA, a volcano. See HAWAII, Vol. XI, p. 475.

MAUPASSANT, HENRI RENÉ ALBERT GUY DE, a French novelist; born in the Château Miromesnil, Normandy, August 5, 1850. He was a pupil and follower of Flaubert, under whom he studied for seven years, beginning to write in 1880. His novels include *Une Vie* (1883); *Bel Ami* (1885); *Mont Oriol* (1887); *Pierre et Jean* (1888); *Fort Comme la Mort* (1889); *Notre Cœur* (1890). He also published several collections of travel sketches, including *Au Soleil* (1884); *Sur l'Eau* (1888); *La Vie Errante* (1890). He ranks high as a writer of short stories, these marvelous examples of his work including *La Maison Tellier* (1881); *Mlle. Fifi* (1883); *Les Soeurs Rondoli* (1884); *Yvette* (1884); *Contes du Jour de la Nuit* (1885); *Contes et Nouvelles* (1885); *La Horla* (1887); *La Petite Roque* (1888); *La Main Gauche* (1889); *Le Pere Milon* and *L'Inutile Beaute* (1890). In 1890 he was forced by a mental malady to cease his labors and two years later he went insane. He died in Paris, France, July 6, 1893. W.M.C.

MAUREPAS, JEAN FREDERIC, COMTE DE, a French statesman; born in Versailles, July 9, 1701. At the early age of 14 he inherited the office of Minister of State, which had been held in his family for upward of 170 years. He did not assume full control of the office until 1725.

Under Louis XV he made a brilliant effort to improve the French commerce. His success was of short duration, for in 1749 he was banished from court for an attack on Madame Pompadour. In 1774 he was recalled and was made Prime Minister by Louis XVI. The chief events of his administration were the restoration of the Parliament of Paris, Nov. 12, 1774, and the alliance with and assistance of the American colonies in their struggle against Great Britain, during the Revolutionary War. He died at Versailles, Nov. 21, 1781. Guyot wrote a history of the administration of Maurepas which was published in Paris in 1782, and was the author of numerous historical and political pamphlets. W.M.C.

MAURITANIA, a section in the N.W. of Africa. See MAURETANIA, Vol. XV, p. 643; and AFRICA, in these Supplements.

MAURITIA, a genus of tall American palms, characterized by their fan-like leaves. It yields, as do many of the palms, useful leaves, timber, fruit and wine.

MAURITIUS. The government of the British Colony of Mauritius, with its dependencies, Rodrigues, Diego Garcia, and the Seychelles Islands, is vested in a governor, aided by an executive council of seven members. There is also a council of government, consisting of the governor and 27 members, 10 being elected, 8 *ex officio*, and 9 nominated by the governor. The constitution was altered by letters-patent dated Sept. 16, 1885, which introduced an elective element into the legislature. Mauritius comprises an area of 705 square miles, and on Jan. 1, 1900, had a population of 370,407, about two-thirds of whom were Indian and 3,226 were Chinese, the remainder being mixed races, Africans and whites. The revenue of the colony in 1900 was $4,590,000; with an expenditure of $4,285,000. The whole debenture debt of the colony, Dec. 31, 1900 was $5,946,420. The declared value of the exports of the colony for the year 1900 was $15,701,643, while the imports amounted to $9,138,180. The staple export is unrefined sugar, while other exports are vanilla, aloe-fiber, cocoanut-oil, rum, and caoutchouc.

The largest part of the foreign trade of Mauritius is carried on with Great Britain and the British colonies. The principal product exported to the United States is sugar. The chief dependence of the island, economically, has been on sugar, although cotton has been a paying product and cereals are profitably cultivated. Among the less important exports are pepper, indigo, cocoanuts, and drugs. Of the articles imported, there might be mentioned machinery, cotton and woolen goods, fertilizers, coal and iron.

There have been many fever epidemics in the island and it has been visited by several destructive hurricanes. Where once the land was covered by a dense and valuable forest growth, plantations have usurped the natural domaine and depleted the animals native to the soil, although the fauna was never great in quantity or variety. The large proportion of domestic animals are of foreign origin.

Port Louis is the capital and largest town and is situated on the northwest coast of the island, surrounded by coral reefs and is the chief harbor of the entire coast. A marked change in population had taken place in Port Louis, most of it having passed from the occupancy of Europeans to Hindus and Chinese. According to the census of 1891 the general population of the island in religious divisions was as follows: Hindus, 209,079; Roman Catholics, 115,438; Mohammedans, 34,763; Protestants, 7,307.

The colony has two lines of railway or a total length of 105 miles, with a large revenue. There is a complete system of telegraph throughout the island. The post-office, according to the last annual report (1900), handled 3,285,771 pieces of mail. All accounts are kept in rupees, and since 1878, the metric system has been in force. For the former history and description of MAURITIUS, see Vol. XV, pp. 646–48.

MAUSOLEUM, a term denoting in general a magnificent tomb or stately, sepulchral monument. The derivation of the word is traced back to Mausolus, king of Corea, who lived about 400 B.C., and who, in the later years of his life, became identified with Halicarnassus, the ancient Greek city on the southwestern coast of Asia Minor, and under whose administration it rose to the height of its prosperity and fame. The great monument erected to the memory of Mausolus by his widow, Artemisia, was instrumental in perpetuating his name, and in making the word "mausoleum" a significant appellation for a tomb characterized by munificence and grandeur. The building of this monumental sepulchre was begun in 353 B.C., and finished 350 B.C., one year after the death of Artemisia. The structure was not only elaborate in its architectural proportions and unique arrangement, but was embellished by the handiwork of the most skillful artists and sculptors the age could afford. The combined massiveness and elegance of the mausoleum at Halicarnassus caused it to be regarded by the ancients as one of the Seven Wonders of the world. For detailed description of this monument, see HALICARNASSUS, Vol. XI, pp. 342, 343. A.R.R.

MAUSTON, a city and the capital of Juneau County, central Wisconsin, thirty-seven miles northwest of Portage, on the Chicago, Milwaukee and St. Paul railroad. It has excellent schools, good water-power, and manufactures lumber, barrels and carriages. Population, 1890, 1,343; 1900, 1,718.

MAUVAISES TERRES. See BAD LANDS, in these Supplements.

MAVROCORDATOS, ALESSANDRO, a modern Greek diplomat, statesman and soldier; born in Constantinople, Turkey, February 15, 1791. He took a prominent part in the Greek war for independence in 1824, and afterward became president of the executive council, but resigned for what he considered to be the interests of harmony. From 1833 to 1846 he was at the head of the cabinet and from 1850 to 1854 was ambassador

to Paris. In 1854 he again became cabinet minister. He is considered the most important leader of the Greek Revolution. He died in Ægina, August 18, 1865. W.M.C.

MAX, Gabriel, painter; born in Prague, Bohemia, in 1840. He studied in Prague and Vienna, and under Piloty at Munich in 1863–69, his *Martyrdom of St. Ludmile* (1865) being the first in a series of tragical paintings, including *The Blind Martyr in the Catacombs; The Maid of Orleans at the Stake*, etc. Later he worked upon mystical subjects, as *Combats of Souls; Visions*, etc.; also on zoölogical subjects, such as *Reconstruction of the Pithecanthropus*. His works have been exhibited in leading art centers. G.J.H.

MAXEY, Samuel Bell, an American soldier; born in Tompkinsville, Kentucky, March 30, 1825. He was graduated from West Point in 1846 and served with honor in the Mexican War, receiving the rank of 1st lieutenant for bravery at Contreras and Churubusco. He was afterward stationed at the Jefferson Barracks, but resigned in 1849. He then studied law and in 1850 was admitted to the bar and opened a practice in Kentucky. He removed in 1857 to Paris, Texas, where he continued his law practice until the out-break of the Civil War. He entered the Confederate army and served through the war, rising to the rank of major-general. In 1863 he commanded the military district of the Indian Territory. At the close of the war he resumed his law practice in Texas and became prominent at the bar. He was elected to the United States Senate in 1874, and was re-elected in 1881. He died in Eureka Springs, Arkansas, August 16, 1895. W.M.C.

MAXIM, Sir Hiram Stevens, an American inventor and engineer; born in Sangersville, Maine, February 5, 1840. He was educated in the village schools and began work in a machine shop. He then went to Fitchburg, Massachusetts, where from metal-working experiences gained at his uncle's works, he rapidly extended his practical training and knowledge by entering the factory of a philosophical instrument maker, and later by joining the staff of some iron workers and ship builders, in each instance assiduously studying in his leisure moments, the theories and sciences which were involved in his daily labors. It was during 1877 that he first turned his attention to electrical matters, when he was retained as consulting engineer to a firm engaged in the development of electric lighting. During 1880 he first visited Europe and England, with a view of investigating practically everything of an electrical nature on the other side of the Atlantic. The following year his exhibits at the Paris Exhibition won him the distinction of chevalier of the Legion of Honor, about which time he became the permanent representative of an American company in Europe. In 1883 he returned to England, making London his headquarters. His early inventions included an incandescent electric light, a process for flashing electric carbons and another for "standardizing" them. In 1882 he utilized the force of a gun's recoil to reload the gun and fire 770 shots a minute. The Maxim-Nordenfelt Company, combining Maxim's patents with those of Nordenfelt, was formed in 1888, and reorganized in 1897 as Vickers Sons and Maxim. He was knighted in 1901. W.M.C.

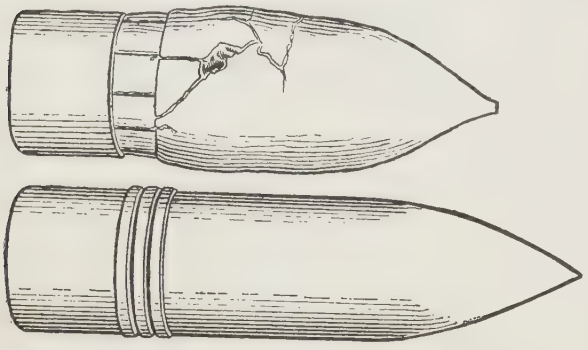
MAXIM, Hudson, an American inventor and engineer; born at Orneville, Maine, Feb. 3, 1853. He attended school and completed his studies at Kent's Hill, Maine, where he paid special attention to chemistry, engineering and the natural sciences. He was the first to make smokeless powder in the United States. Under his own patents and those of Dr. Robert G. Schüpphaus, the Maxim-Schüpphaus smokeless powder was the first smokeless powder adopted by the United States Government. Mr. Maxim is best known as the inventor of "Maximite" (q.v.), the first high explosive bursting charge ever successfully employed in armor-piercing projectiles. The United States Government has purchased the secret of its manufacture. As a necessary adjunct to maximite, he has also invented a detonating fuse that is incapable of prematurely exploding the maximite charge, either in handling, transporting or firing projectiles from a gun, while it insures their certain explosion inside a war vessel, after passing through the thickest armor-plate. Still another invention is his new smokeless powder known as "Stabillite," which does not undergo chemical or climatic deterioration. This powder, in recent tests, has given higher ballistic results than have heretofore been obtained with any other powder. Mr. Maxim's latest invention is a new automobile torpedo propelled by "Motorite" a substance consisting of nitro-glycerin and gun-cotton, used as fuel for a steam turbine propellor. It gives greater speed and range to torpedoes than have been achieved with any other fuel. W.R.B.

MAXIMITE, a high explosive employed as a bursting charge for projectiles, invented by Hud-

Fragmentation with 70 lbs. of Maximite of 12-inch forged steel A. P. shell, which illustrates, by the regularity in size and the ragged character of the fragments, the terrific violence of the detonation.

son Maxim, of Brooklyn, N. Y. The secret of the invention, and the exclusive right to the use of the explosive, was purchased by the United States Government in 1901, after very exhaustive trials at Sandy Hook proving grounds. Maximite was the first high explosive to be successfully employed as a bursting charge for armor-

piercing projectiles. This explosive, while it is claimed to be fifty per cent. more powerful than ordinary dynamite, is so insensitive that it will not only safely withstand the shock of discharge from the gun, but will also stand the far greater shock of penetrating armorplate as thick as the projectile containing it is capable of passing through, the projectile being then exploded immediately behind the plate with a delay-action detonating



Two six-pounder A. P. shells, one showing the shell in its normal shape, the other a shell which was filled with Maximite and fired at a 3-inch plate, entering about half its length, upsetting, as shown, until it broke open at the side, some of the Maximite being forced through the aperture. This shell rebounded from the plate about 200 feet and struck in front of the gun from which it was fired, all without exploding. This was a test for insensitiveness, the shell carrying no fuse.

fuse. Ignited in the open, maximite simply burns like pitch. Projectiles are charged with it by the simple process of melting and pouring, the explosive solidifying on cooling, and adhering firmly to the walls of the shell. The chemical composition of maximite is a United States Government secret, but it is known to be a picric acid compound. W.R.B.

MAXIMS, axioms of practical wisdom, self-evident propositions, or sentences expressing established principles or important truths. There are other words used interchangeably with maxim when used to denote short and pithy sayings and tersely expressed precepts, such as proverb, adage, apothegm and saw; but, while all these have a similar generic meaning, they lack the technical and superlative significance peculiar to maxims when applied to law and philosophy.

Maxims quoted in English and American law practice have in many instances come down from Greek and Roman jurisprudence, and through the Continental usages of law and equity. A great many of the phrases and sentences, purporting to express a fundamental principle and precedent, have, in modern times, been superseded by new or modified maxims of law, but the number of ancient origin, still in use and referred to as guides in action, is very large.

They may be used to effect a proper balance of rights and verify the claim, *Æquitas sequitur legem* — equity follows the law. Another thought couched in epigram of antique lore reads: *Summum jus, summa injuria* — the rigor of the law is the height of oppression. The former implies that law, founded in philanthropy and actuated by high motives, its operations must result in the reign of justice and the distribution of deserved awards. The latter is a frank acknowledgment that strict adherence to the letter of man-made statutes is apt to work hardships and entail wrongs unless tempered with a clemency, suggestive, perchance, by the wisdom gained from experience and expressed in maxims. Relative to evidence in legal practice some examples might be given as, *Qui nimium probat nihil probat* — he who proves too much proves nothing; *Suppressio veri, suggestio falsi* — a suppression of the truth is the suggestion of a falsehood. Of general practical application there are numerous examples of which the following might be cited: *Fraus est celare fraudem* — to conceal a fraud is itself a fraud; which implies a double offense against the individual perpetrating a fraud and then hiding it, or implicating in the wrong another party cognizant of the fraud perpetrated and neglecting to disclose it. *Qui faceat per alium, facit per se* — he who acts by another, acts himself; which expresses the accountability in law of an employer for his agent or employee while acting under his instructions.

Other maxims, not restricted to a particular profession but the outgrowth of general philosophy based on thought and reason are met in every field of human experience. *Cogito, ergo sum* — I think, therefore I am; a recognition of the fact that the mind, the thinker, acting through the instrumentality of the brain produces thought and therefore proves its existence by its own action; in other words, the self-conscious self furnishes incontrovertible evidence of life and constitutes a basic axiom. *Vincit omnia veritas* — truth conquers all things — is but another rendering of the maxim, *Magna est veritas, et prævalebit* — truth is mighty and will prevail. The idea expressed is in harmony with facts in nature that goodness, justice and the verities are self-perpetuating and eternal, while evil, wrong and falsehood have within themselves the elements of their own destruction and must in time yield to the superior and invincible forces inherent in the principles of truth.

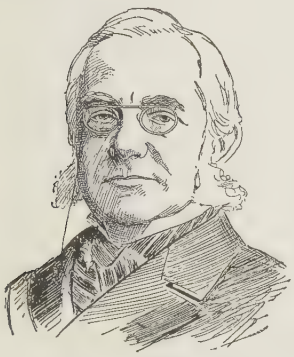
Modern maxims, like those of ancient growth, are evolutions of the thought and experience of the ages that give them currency. Originating in the genius of humanity they are the fruitage of the combined philosophies that mark the progress of mankind. Their protection against abuse or deterioration lies in their intrinsic merit, being accepted only when they appeal to the understanding as constituting veritable wisdom.

A.R.R.

MAXIMUM AND MINIMUM, literally, greatest and least, derived from the Latin, the former from *magnus*, superlative, *maximus*, and the latter from *parvus*; superlative, *minimus*. The terms are often used in ordinary transactions and in deliberative assemblies in denoting the extreme points to be yielded or reached in business or parliamentary decisions; but their chief uses are in mathematical calculations, and are then frequently used in their plural forms — maxima and minima.

In a mathematical sense, they signify the greatest and least values of variable quantities or magnitudes. It must not be understood, however, that a maximum quantity always represents the greatest possible values of a variable, but generally only that which is greater than the values immediately preceding or following it in the series; and, likewise, a minimum value is relatively the smallest of those that precede or follow it in the computation. The terms used in an algebraic sense are applied to the infinitely large and infinitely small. Illustrations of the functions of the terms are found in the article on INFINITESIMAL CALCULUS, Vol. XIII, pp. 7–79. A.R.R.

MAX–MÜLLER, FRIEDRICH, an Anglo-German philologist, and son of the poet, Wilhelm Müller, was born at Dessau, Germany, Dec. 6, 1823. He was educated at Leipsic and Berlin, and took his degree in 1843, after which he proceeded to Paris, where he studied Sanskrit and the sacred books of the East under Eugène Burnouf. In Germany he had previously studied Arabic and Persian, as well as philosophy and comparative philology. In 1846 he visited England for the purpose of examining manuscripts in the East India House and at the Bodleian Library, Oxford, and in the following year was commissioned by the East India Company to edit the *Rig-Veda*, which was subsequently issued by the University Press, Oxford. In 1850 he was appointed deputy Taylorian professor of modern languages at Oxford, and four years later succeeded to the professorship. He became curator and subsequently oriental librarian of the Bodleian Library in 1856, and was elected a fellow of All Souls' College in 1858. In 1868 he was appointed professor of comparative philology at Oxford, and held the chair until 1875, when he accepted the editorship of the series of important translations of the *Sacred Books of the East*. Of the series, 49 volumes have been issued, which embrace translations of the *Upanishads;* the *Dhammapada;* the *Zend-Avesta:* the *Vedic Hymns;* the *Qur'ân (Koran);* the *Gaina* and *Vedanta-Sûtras* the Buddhist *Mahâyânâ* Texts; the Sacred Books of China; and the *Institutes of Vishnu*. Professor Max-Müller has the faculty of investing his subjects with life and interest for even the unlearned reader, and has specially enriched them by his successful method of approaching the history of man's religious and intellectual development by the study of human speech. He is one of the eight foreign members of the Institute of France, and was elected first president of the Aryan section at the Internationalist Congress of Orientalists, held at Stockholm in 1889. He has also been the recipient of numerous foreign decorations, and on his seventieth birthday (1893) he received addresses and congratulations from the various academies, universities and learned societies which have enrolled his name among their honorary members. Besides this monumental work, Professor Max-Müller translated in 1890–92, and published under the auspices of the Maharajah of Vizianagram, *Sacred Hymns of the Brâhmins*, with other critical texts and commentaries on Brâhmanic, Buddhist, Pahlavi and Confucian literature and the early ceremonial law of the Orient. He has also published a *History of Sanscrit Literature* (1859), with illustrations of the primitive religions of the Brâhmans; a *Sanscrit Grammar for Beginners* (1886); and a volume of Hibbert lectures on the *Origin and Growth of Religion*, as illustrated by the religions of India (1879). Not less important have been his labors in the new science of comparative philology. The chief results of these labors appear in the series of five volumes entitled *Chips from a German Workshop*, embracing essays on philology, mythology, traditions and customs, and on the science of religion. In 1861–64 appeared the famous *Lectures on the Science of Language*, delivered at the Royal Institution, London; and in 1887–88 were published his *Lectures on the Science of Thought*. Then came his Gifford lectures on *Natural Religion and Physical Religion* (1891); *Anthropological Religion* (1893); *Theosophy, or Psychological Religion* (1893); and *The Six Systems of Indian Philosophy* (1899). He wrote the article ARYANS in this ENCYCLOPÆDIA. See Vol. II. 587–89. Mr. Max-Müller was the recipient of many honors. He died Oct. 28, 1900.



MAX–MÜLLER.

MAX O'RELL. See BLOUET, PAUL.

MAXWELL, SIR HERBERT EUSTACE, an English writer, seventh baronet of Monreith; born Jan. 8, 1845, and educated at Eton and Christ Church. In 1880 he was elected from Wigtonshire as a Conservative member of Parliament. From 1886 to 1892 he was a Lord of the Treasury. He published numerous papers on archæology and natural history, besides miscellaneous essays and several novels. Among his writings are *Passages in the Life of Sir Lucian Elphin; Bruce and the Struggle for Scottish Independence*, and a *Life of the Duke of Wellington* (2 vols., 1899). He was appointed Rhind lecturer in archæology at the University of Edinburgh in 1893.

MAXWELL, MARY ELIZABETH (BRADDON), an English novelist; born in Soho Square, London, in 1837, the daughter of a solicitor. She very early showed a turn for literature, which she indulged in the usual manner, by sending verses and other trifles to the magazines and newspapers. Neither a comedietta brought out at the Strand in 1860, a volume of verse, nor one or two novels, had had much success, when, in 1862, *Lady Audley's Secret*, the story of a golden-haired murderess, attained an enormous popularity, in three months reaching its eighth three-volume edition. *Aurora Floyd* (1863) was little less popular. Of all her many novels, perhaps the best is *Ishmael* (1884), a tale of the second empire, which depends not so much on sensation as on character. In 1874 she married John Maxwell, publisher of *Belgravia*, the monthly magazine which Miss Braddon edited, and in which many of her later novels appeared.

MAXWELL, WILLIAM HENRY, educator, was

born in Ireland on March 5, 1852, and was graduated from Queen's College, Galway, in 1872. He came to America in 1876, and for some years was a journalist in New York, and was also a lecturer and night school teacher. In 1882 he became assistant superintendent, and in 1887 superintendent of public schools in Brooklyn, N. Y., serving until 1898, since which date he has been superintendent of schools of the whole city of "Greater" New York. He is the author of a series of widely used text-books on English grammar, and of an edition of the *Iliad*, and lectures much at teachers' institutes and educational gatherings. W.F.J.

MAY, Samuel, clergyman; born in Boston, Mass., April 10, 1810; was graduated at Harvard College in 1829, and at the Harvard Divinity School in 1833. In the latter year he was ordained pastor of the Congregational Unitarian Church in Leicester, Mass. He resigned this pastorate in 1845, and was agent of the Massachusetts Anti-Slavery Society in 1847–65. He then took a prominent part in founding the New England Freedmen's Aid Society. Mr. May died in Leicester, Mass., Nov. 24, 1899. G.J.H.

MAY, Samuel Joseph, reformer; born in Boston, Mass., Sept. 12, 1797; graduated at Harvard College in 1817, and studied theology in the Harvard Divinity School. He was ordained in the Unitarian Church, and in 1822 was settled over a church in Brooklyn. From early life he was an active abolitionist, and so vigorously preached emancipation that he was mobbed and burnt in effigy in Syracuse in 1830. In 1833 he was a delegate to the convention which established the American Anti-Slavery Society. He served the Massachusetts Anti-Slavery Society as general agent for eighteen years. In 1836–42 he was pastor of the Unitarian Church at South Scituate, Mass., and in 1845–68 had charge of the Unitarian Church in Syracuse, N. Y. His publications include *Education of the Faculties;* and *Recollections of the Anti-Slavery Conflict*. He died in Syracuse, N. Y., July 1, 1871. G.J.H.

MAY, Sir Thomas Erskine. See Farnborough, Lord, in these Supplements.

MAYA, doctrine of illusion. See Hindustani, Vol. XI, p. 754.

MAYAGUEZ, a town. See Porto Rico, Vol. XIX, p. 547.

MAYAPAN. See Yucatan, Vol. XXIV, p. 796.

MAY-APPLE. See Podophyllin, Vol. XIX, p. 267.

MAYA-QUICHA INDIANS. See Yucatan, Vol. XXIV, pp. 797–798.

MAY-BUG or MAY-BEETLE, a name sometimes given to the cockchafer, *Melolontha*. See Coleoptera, Vol. VI, p. 119.

MAYENCE. See Mainz, Vol. XV, p. 308.

MAYER, Alfred Marshall, scientist, was born in Baltimore, Md., on November 13, 1836, and was educated at St. Mary's College. He turned his attention to natural science, and became a member of the faculties of various colleges and of the Stevens Institute of Technology at Hoboken, N. J. He did much editorial work on *The American Journal of Science*, and was the author of *The Earth a Great Magnet*, *Light*, *Sound*, and *Sport with Gun and Rod*. He died on July 13, 1897. W.F.J.

MAYER, Brantz, scientist and author, was born in Baltimore, Md., on September 27, 1809, and was educated at St. Mary's College, Baltimore, and travelled extensively in the far East. He became a lawyer, was secretary of legation in Mexico in 1841, edited *The Baltimore American* for a time, and devoted much attention to Mexican archæology and other scientific topics. He wrote a *History of the Mexican War*, *Mexico — Aztec, Spanish and Republican*, *Observations on Mexican History and Archæology*, *Mexican Antiquities*, *Tah-Gah-Jute, or Logan and Captain Cresap*, *Captain Canot* (a novel), and other works. During the Civil War he was a paymaster in the United States army, and served in that capacity from 1863 to 1871, retiring with the rank of colonel. He died in Baltimore on February 23, 1879. W.F.J.

MAYER, Constant, artist, was born at Besancon, France, on October 4, 1832, and came to America in 1857. He was elected an associate of the National Academy in 1866, and was made a chevalier of the Legion of Honor, of France, in 1869. He produced many paintings, chiefly *genre*, and was also a successful portrait artist. Many of his works have been engraved and have become widely popular, among them being his portraits of General Grant and General Sherman. W.F.J.

MAYES, Edward, lawyer and educator, was born in Mississippi on December 15, 1846, studied at Bethany College and the University of Mississippi, was a Confederate soldier in the Civil War, and was chancellor of the University of Mississippi in 1889–92. W.F.J.

MAYFIELD, a city and the capital of Graves County, western Kentucky, 23 miles S. of Paducah, on Mayfield Creek, and on the Illinois Central railroad. It is in a cotton-raising region, selling annually about ten million pounds of cotton raised in the vicinity. It has tobacco-houses and manufactures flour and woolen goods. It has electric lights and water-works. Population 1900, 4,081.

MAYFLOWER DESCENDANTS, Society of. See Colonial Societies, in these Supplements.

MAY-FLY, the popular name for many species of Ephemeridæ, Vol. VIII, p. 407.

MAYHEW, Augustus, an English author; born in London, in 1826. He was a brother of Henry Mayhew (q. v.). He wrote a number of tales and sketches of a broadly humorous character, which enjoyed a considerable share of popularity. The novel entitled *Paved with Gold* was commenced by Henry and Augustus in copartnership, but was soon afterwards continued and conducted to a most effective termination by Augustus alone, who also wrote *The Prettiest Girl in Bloomsbury*. He died in London in 1875. W.M.C.

MAYHEW, Henry, an English author and

statistician; born in London, November 25, 1812. He ran away to sea and on his return to London commenced his literary career. With Gilbert a'Beckett, he took the Queen's Theatre, in London, and there produced his first farce called *The Wandering Minstrel*. About the same time he started the comic publication *Figaro in London;* he was also the chief originator of *Punch*, which was commenced in 1841, and of which he was for a long time the editor. Between the years 1846 and 1851 he published in conjunction with his brothers Horace and Augustus, a series of humorous tales which became very popular. His most important work was that produced in 1851, entitled *London Labor and the London Poor;* a cyclopædia of the condition and earnings of those that will work, of those that cannot work and those that will not work. He died in London, England, July 25, 1887. W.M.C.

MAYHEW, Horace, an English author; born in London, in 1816. He assisted his brother Henry Mayhew (q.v.) in writing various books and in editing *Punch*. He died in London, April 30, 1872. W.M.C.

MAYHEW, Experience, an American missionary; born in Martha's Vineyard, Mass., Jan. 27, 1673. He became prominent as a missionary among the Indians, and translated the *Psalms* and the *Gospel of Saint John* into the Indian tongue. He wrote numerous tracts and religious works, including *Indian Converts* (1727), which contains accounts of thirty Indian missionaries. He died in Martha's Vineyard, Nov. 29, 1758. W.M.C.

MAYHEW, Jonathan, an American clergyman; born in Martha's Vineyard, Mass., Oct. 8, 1720; son of Experience Mayhew. He was graduated from Harvard College in 1744, and from 1747 until his death was pastor of the West Church in Boston. His sermons and tracts obtained for him a high reputation, and many of them were republished in England. His published writings include *Seven Sermons* (1749); *Sermons* (1756). He died in Boston, July 9, 1766. W.M.C.

MAYHEW, Thomas, an American colonial governor; born in Southampton, England, March, 1592. He emigrated to New England in 1641 and settled first at Watertown, Mass. In 1642 he secured from Lord Stirling a grant of the larger part of the island of Martha's Vineyard and was given the title of governor. With his son Thomas he labored to convert the Indians of the island, so successfully that during King Philip's War the island Indians protected the white settlers from the tribes of the mainland. He died in Martha's Vineyard in 1862. W.M.C.

MAY LAWS or FALK LAW. See Germany, Vol. X, pp. 456, 457, 458.

MAYNARD, George Willoughby, an American artist; born in Washington, December 5, 1843. He studied at the Royal Academy of Fine Arts of Antwerp, and in 1878 had a studio in Paris. In 1885 he was elected a National Academician. In 1884 he was awarded a medal at the Pennsylvania Academy of Fine Arts. Besides numerous portraits, his works include *Vespers at Antwerp* and *1776*, sent to the Centennial Exhibition; *Water Carriers of Venice* (1878); *Musical Memories*, and *Venetian Court* (1880); *An Ancient Mariner* (1883); *Aurora* (1884); *Strange Gods* (1885); *Portrait of a Child* (1886), and *Old and Rare* (1887). W.M.C.

MAYNARD, Horace, statesman, was born at Westboro, Mass., on August 30, 1814, and was graduated from Amherst College in 1838. He went to eastern Tennessee, became professor in the East Tennessee University, and was admitted to the bar in 1844. In 1857–63 he was a representative in Congress. During the Civil War he was a Unionist, and on that account suffered heavy losses of property. He was in Congress again in 1867–75, and in 1875 went as United States Minister to Turkey. He was made postmaster-general in 1880, and died on May 3, 1882. W.F.J.

MAYO, Frank, an American actor; born in Boston, Massachusetts, April 19, 1839, and educated at the public schools. He made his first appearance on the stage at the American Theater, San Francisco, in 1856. He traveled through the mining towns with various companies, playing the leading parts in *Jessie Brown* and in *The Streets of New York;* in 1867 became a star, and in 1872 produced, at Rochester, *Davy Crockett*, the play in which he made his greatest success. For two years preceding his death he appeared in the title *rôle* of *Puddin'head Wilson*, which he dramatized from Mark Twain's story of that name. He died at Grand Island, Nebraska, June 8, 1896.

MAYO, Mrs. John Ryall (Isabella Fyvie), novelist and journalist under the name of "Edward Garrett"; was born in London on December 10, 1843, of Scottish parentage, and married J. R. Mayo in 1870. She has been a voluminous writer, among her books being *By Still Waters; The Chapel Girls; Family Fortunes; Mrs. Raven's Temptation; At Any Cost; The Mystery of Alan Grale; John Winter; A Black Diamond; Rab Bethune's Double; A Nine Days' Wonder*, and *Chrystal Joyce*. W.F.J.

MAYO (Richard Southwell Bourke), Earl of. See India, Vol. XII, p. 851.

MAYO, William Starbuck, author, was born at Ogdensburg, N. Y., on April 20, 1812, a descendant of John Mayo, who was pastor of the North Church, Boston, in 1622–55. He was educated at the College of Physicians and Surgeons in New York, and practiced his profession for some years. Then he visited Spain and the Barbary States for his health, and devoted his attention thereafter to literary work. Most of his writings were romances and imaginative adventures. He died in New York City on November 22, 1895. W.F.J.

MAYOR. See Municipality, Vol. XVII, pp. 33–37.

MAYOR, John Eyton Bickersteth, classical scholar; was born of English parents, in the island of Ceylon, on January 28, 1825, and was

educated at Cambridge. He became a fellow of St. John's, Cambridge, in 1849, assistant master of Marlborough College in 1849–53, librarian of Cambridge in 1863–67, and since 1872 has been professor of Latin at that university. He has edited many Latin classsics and other works, and has written many volumes and has published innumerable addresses and magazine and review articles. He has received degrees from Oxford, Glasgow and Aberdeen. W.F.J.

MAYSVILLE, a city of northeastern Kentucky. It is on the Kentucky Central and the Chesapeake and Ohio railroads. Its manufactures include cotton, tobacco, cigars, furniture, lumber and flour. The city is supplied with electric and gas lights, gas fuel, elèctric street-railways, and has several educational institutions. Population 1900, 6,423. See also MAYSVILLE, Vol. XV, p. 657.

MAYVILLE, a village and the capital of Chautauqua County, southwestern New York, 17 miles N.W. of Jamestown, beautifully situated near the head of Chautauqua Lake, on the Western New York and Pennsylvania and the Chautauqua Lake railroads. It has regular steamboat connection with Jamestown. It is in a farming region, has flour-mills and some industries. Population 1900, 943.

MAZAR-I-SHARIF. See AFGHANISTAN, Vol. I, p. 218.

MAZDAK. See PERSIA, Vol. XVIII, pp. 622, 623.

MAZURANIC, IVAN. See SERVIA, Vol. XXI, p. 724.

MAZURKA, a lively dance, the music of which is three-four time with a strong accent on the second beat. It was originally danced by four or eight couples, but in America has been adapted to any number, in the same manner as the polka. In its old form it is much practiced in the south of Germany and in Poland, from whose province, Mazovia, it gets its name. The earliest records of the mazurka bear the date of the sixteenth century, was first danced in Germany in 1760 or thereabouts, and in time spread over the whole of Europe and America. To Chopin, more than to any other composer, is due the popularity of this dance.

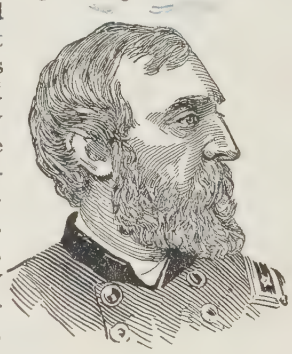
MAZZUOLI OR MAZZOLA. See PARMIGIANO, Vol. XVIII, pp. 323, 324.

MEAD, EDWIN DOAK, an American editor and author; born in Chesterfield, N. H., Sept. 29, 1849. He was educated in English and German universities. In 1889, he was associate editor of *The New England Magazine*, and was chief editor in 1890–91. He has written *The Philosophy of Carlyle* (1881); *Martin Luther* (1884); *A More Beautiful Public Life* (1894); *The Roman Church and the Public Schools* (1895). W.M.C.

MEAD, LARKIN GOLDSMITH, sculptor, was born at Chesterfield, N. H., on January 3, 1835, became a clerk in a hardware store, studied art under Henry K. Brown, in Brooklyn, N. Y., and in 1855 produced a statue of *The Recording Angel*. He also made in 1857 the colossal statue of *Vermont* for the dome of the state house at Montpelier, Vt. He was a soldier, correspondent and artist in the Civil War, since when he has resided chiefly in Italy. He made at his studio in Italy and brought thence to America the model for the statue of *Lincoln* for the monument at Springfield, Ill., and also the model for that of *Ethan Allen* in the Capitol at Washington. W.F.J.

MEADE, FORT, in the Department of the Platte, with a post-office of the same name, and a telegraph and railroad station at Sturgis, four miles west, on the Fremont, Elkhorn and Missouri Valley railroad, in Meade County, western South Dakota. The fort is situated on the borders of the famous Black Hills region, not far from Deadwood, and is garrisoned by eight companies of cavalry.

MEADE, GEORGE GORDON, military officer; born in Cadiz, Spain, Dec. 31, 1815; son of Richard W. Meade, United States naval agent at Cadiz in 1805–16; was graduated at the United States Military Academy in 1835; entered the army as brevet 2d lieutenant, July 1; commissioned 2d lieutenant, Dec. 31; resigned, Oct. 26, 1836; rejoined the army as 2d lieutenant of Topographical Engineers, May 19, 1842; was promoted 1st lieutenant, Aug. 4, 1851; transferred to the Engineer Corps, March 3, 1863; and was promoted major-general, Aug. 18, 1864. In the volunteer service he was appointed brigadier-general, Aug. 31, 1861, and promoted major-general, Nov. 29, 1862. After his graduation at the Military Academy he served in the Seminole War, but was compelled to leave Florida on account of ill health, which occasioned his resignation from the army. In 1840 he was appointed assistant civil engineer on the survey of the northwestern boundary between the United States and British America. He was still connected with this survey when he re-entered the army. In 1845 he was assigned to the staff of General Taylor, and in 1846 took part in the battles of Palo Alto and Resaca de la Palma, and especially distinguished himself in the attacks on Independence Hill at Monterey. On Aug. 31, 1861, he was placed in command of the 2d Pennsylvania Reserve Brigade. He participated in the engagements of Gaines's Mills, Mechanicsville, and Newmarket Cross Roads. During the latter battle he was so seriously wounded that he was removed to his home in Philadelphia. After his recovery he took part in the second battle of Bull Run. Later he greatly distinguished himself at the battles of Antietam and Fredericksburg. On Dec. 25, 1862, he was placed in command of the 5th Army Corps, and led this command during the action of Chancellorsville. On June 23, 1863, he superseded Hooker in the command of the Army of the Potomac; immediately



GEN. G. G. MEADE.

took the offensive; and marched on a parallel line with Lee, until the latter halted at South Mountain. Meade then ordered General Hancock to select a suitable position for the Union troops. Hancock recommended Gettysburg, and here Meade concentrated his army. The Confederates attacked the Union lines on July 1, but were completely defeated on July 3. He died in Philadelphia, Pa., Nov. 6, 1872. G.J.H.

MEADE RIVER, a stream of northwestern Alaska, rising about 100 miles inland and flowing northeast into the Arctic Ocean, in long. 154° 40′ W. Its course, though not very well known, is about 175 miles long, and is through a valley rich in the lower forms of vegetation. It was discovered by Lieutenant Ray in 1883.

MEADOW-LARK (*Sturnella magna*), the popular name of a bird of the oriole family. During the summer the meadow-lark migrates to all the Northern states, returning southward in the winter. It is one of the most valuable insectivorous birds. The bird is well known on account of its sweet, plaintive notes. It often is called the American starling. See ICTERUS, Vol. XII, pp. 735, 736.

MEADOW-MOUSE. See VOLE, Vol. XXIV, pp. 297, 298; MOUSE, Vol. XVII, p. 11; and FIELD-MOUSE, in these Supplements.

MEADOW-SAFFRON. See COLCHICUM, Vol. VI, p. 113.

MEADVILLE, a city of northwestern Pennsylvania. Meadville's more recently established industries include the manufactures of engines, boilers, oil-well supplies, leather belting, wood mantels, sashes and blinds and beer. Allegheny College, located here, had, in 1896, 17 instructors, 340 students and a library of 14,000 volumes. A system of waterworks, natural gas for fuel, and electric-light plants add to the natural advantages of the city. See also MEADVILLE, Vol. XV, p. 663. Population 1890, 9,520; 1900, 10,291.

MEAL-WORM. See COLEOPTERA, Vol. VI, 114.

MEANS, Mathematical. See PAPPUS, Vol. XVIII, p. 234.

MEARES, JOHN, an English navigator; born in Liverpool in 1756. As a youth he followed the sea, entered the British royal navy in 1776, and served as a junior officer in the West Indies in the war between Great Britain and France until peace was declared in 1783. He then entered the British merchant service as a captain and in 1786 explored the coast of Alaska. Three years later he made a second exploration of the Alaska country and the Pacific northwest with a fleet of three vessels. He made numerous valuable discoveries upon which Great Britain based its claim to the possession of Oregon and British Columbia. Captain Meares was the founder of the Northwest American Company organized to open trade with the Russian colonies in North America. He was given the rank of commodore in 1796. He was the author of *Voyages in the Years 1788–89 from China to the Northwest Coast of America* (1790) and was a frequent contributor to British periodicals. He died in London in March, 1809. W.M.C.

MEARNS. See KINCARDINE, Vol. XIV, 80, 81.

MEASON, MALCOLM RONALD LAING, soldier, editor, correspondent and traveler; was born at Edinburgh in 1824, and entered the British army in 1839. After a military career of some distinction in India he became in 1851–54 editor of the Bombay *Telegraph*. Since then he has served as a special correspondent of the London *Daily News*, the London *Daily Telegraph*, the New York *Herald*, and other papers. He was a *Herald* correspondent in the first part of the Franco-German War of 1870–71, and a London *Daily Telegraph* correspondent after Sedan. He has also been connected with various English weekly publications. His books include *The Bubbles of Finance* (1865); *The Profits of Panics* (1866); *Turf Frauds* (1875); *Three Months after Date and Other Stories* (1886), and *Sir William's Speculations* (1886). W.F.J.

MEATH, EARL OF, REGINALD BRABAZON, was born in London on July 31, 1841, was educated in Germany, and had a distinguished career in the diplomatic service. In the last thirty years he has been at the head of innumerable philanthropic movements, and has published various writings on social reforms. W.F.J.

MEASURE, in music. See MUSIC, Vol. XVII, pp. 89, 90.

MEASURES. See WEIGHTS AND MEASURES, Vol. XXIV, pp. 505–518.

MEASURING-MACHINES. See MACHINE TOOLS, Vol. XV, p. 158.

MECCA BALSAM OR BALM OF GILEAD. See BALSAM, Vol. III, p. 252.

MECHANICAL POWERS. See MECHANICS, APPLIED, Vol. XV, pp. 758–784.

MECHANICAL SCHOOL. See TECHNICAL SCHOOLS, in these Supplements.

MECHANIC FALLS, a post village of Androscoggin County, southwestern Maine, 10 miles W. of Lewiston, on a tributary of the Androscoggin River, and on the Portland and Rumford Falls and the Grand Trunk railroads. Paper, rifles, shoes, cheese, harness, organs and furniture are manufactured here. There is also a corn-canning establishment. Population 1890, 1,283; 1900, 1,687.

MECHANICS, ANIMAL STRENGTH IN. See MECHANICS, APPLIED, Vol. XV, p. 783.

MECHANICSBURG, a post village of Champaign County, western central Ohio, 17 miles N.W. of Springfield, on the Cleveland, Cincinnati, Chicago and St. Louis railroad. It is in a fertile corn and wheat-growing region, and has lumber and woolen mills, planing-mills and a machine-shop. Population 1890, 1,459; 1900, 1,617.

MECHANICSBURG, a post borough of Cumberland County, southern central Pennsylvania, eight miles W. of Harrisburg, on the Cumberland Valley railroad. It is in a farming and mining region, and contains a foundry, spoke and bending works, and door and sash factories. Irving Female College (Lutheran) and Cumberland Valley Institute are situated here, and the borough has a public library, graded schools and two national banks. Population 1890, 3,691; 1900, 3,841.

MECHANIC'S LIEN. See LIEN, Vol. XIV, p. 573.

MECHANICSVILLE, a village of Saratoga County, New York, in the eastern part of the state, on the Hudson River, 17 miles north of Troy, has manufactures of thread and other articles, and is reached by the Delaware and Hudson and the Fitchburg railroads. Its population in 1900 was 4,695. W.F.J.

MECHANICSVILLE, a small town of Hanover County, eastern central Virginia, seven miles N.E. of Richmond, important only for the battle which bears its name, the second of the so-called "seven days' battles," by which McClellan, in command of the army of the Potomac, effected his retreat from before Richmond. On June 26, 1862, the Confederate force under Gen. D. H. Hill made an ill-concerted attack on Fitz-John Porter, who had no difficulty in repelling the enemy at every point and inflicting on them heavy loss, placed by Swinton, on the authority of General Longstreet, at between 3,000 and 4,000, while the Federal loss was less than 400.

MECHANISM OF HEREDITY. See HEREDITY, in these Supplements.

MECKLENBURG DECLARATION OF INDEPENDENCE, a series of five resolutions said to have been approved on May 20, 1775, by the citizens of Mecklenburg County, North Carolina, in view of a vote of the British Parliament denouncing the action in Massachusetts as rebellious.

Of these resolutions the general public seems to have known nothing until 1819, when, on April 30th of that year, the Raleigh *Register* printed a draft of them. The first resolution pronounces to be "enemies of this country" those who abetted the British "invasion of our rights," while the fourth and fifth provide for the preservation of order and the execution of processes pending the reorganization of government in the colonies.

The second and third are the famous ones, and read as follows:

"*Resolved*, 2. That we, the citizens of Mecklenburg County, do hereby dissolve the political bands which have connected us to the mother-country, and hereby absolve ourselves from all allegiance to the British crown, abjure all political connection, contract or association with that nation, who have wantonly trampled on our rights and liberties, and inhumanly shed the blood of American patriots at Lexington.

"*Resolved*, 3. That we do hereby declare ourselves a free and independent people; are, and of right ought to be, a sovereign and self-governing association, under the control of no power, other than that of our God and the general government of the Congress, to the maintenance of which independence we solemnly pledge to each other our mutual co-operation, our lives, our fortunes and our most sacred honor."

Jefferson at once declared the publication fraudulent, while John Adams wrote to Jefferson that had he known of such resolutions in 1776 he would have made the halls of Congress ring with them. Owing to the verbal correspondence between this series of resolutions and the phrases of the famous declaration attributed to Jefferson, a great deal of attention was drawn to the Mecklenburg declaration.

Thorough investigation followed. A committee of the North Carolina legislature in 1831 declared the claim established, and May 20th was made a state holiday. Private contemporaneous and subsequent investigations seemed to establish the fact that certain resolutions were passed at a meeting of citizens in Mecklenburg County, and that a special messenger, one Captain Jack, had been sent with the resolutions to the Continental Congress at Philadelphia; but no satisfactory evidence was adduced to prove the identity of the resolutions. By tradition, two separate sets of resolutions were passed by this convention, one on May 20th and the other on May 31st, but it was indicated that as these two dates exactly correspond with the difference between the old style and new style, and that both calendars were then in use in many places, they may have been confused in individual testimony. However, the set of resolutions passed on the 31st were twenty in number and contained no declaration of independence. These were published at once, both North and South, but the other set containing the declaration was not published until forty-four years had elapsed. It was also established that the original draft of the resolutions of May 20th was burned in 1800. The question of the authenticity of this declaration still remains in dispute, and Bancroft, in the last revision of his *History of the United States*, judiciously left the matter undetermined. *Revised by* R.W.C.

MEDAL. See NUMISMATICS, Vol. XVII, pp. 643–680.

MEDEA'S OIL. See GREEK FIRE, Vol. XI, pp. 142, 143.

MEDEENET–HABOO, town and temples. See EGYPT, Vol. VII, pp. 676, 677.

MEDFORD, a city of eastern Massachusetts. The city is connected with Boston by electric railway, and manufactures rum, crackers, felt boots, brass castings, carriages, paper and other articles. It was made a city in 1892. It has a public library with 18,500 volumes, water-works, fire department, etc. Population 1890, 11,079; 1900, 18,244. See also MEDFORD, Vol. XV, p. 473.

MEDFORD, a city and the capital of Taylor County, central Wisconsin, 40 miles W.N.W. of Wausau, on the Wisconsin Central railroad. It is in a lumbering region, and has saw-mills, a tannery and an excelsior factory. Population 1890, 1,193; 1900, 1,758.

MEDIA, a borough and the county seat of Delaware County, Pennsylvania, in the southeastern corner of the state. It is in a rich agricultural region, and is a favorite place of suburban residence, being only twelve miles southwest of Philadelphia. It is reached by the Philadelphia, Wilmington and Baltimore railroad, and is a few miles from the Delaware River. It is the site of an important seminary. Its population in 1900 was 3,075. W.F.J.

MEDICAL ASSOCIATIONS IN THE UNITED STATES, societies for the promotion of professional fellowship, the comparison of medical theories and modes of practice, and the consid-

eration of measures to improve and elevate the science and the art of medicine. Naturally, these associations are as various as the different schools, or sects, of medicine. By far the greater number are associations whose members are the so-called "regulars." Others are associations of the homœopathic school, the eclectic school, etc. The general plan of organization is as follows: Physicians of the same school in a county form themselves into a county medical society. Of these county societies there are many thousands in the United States. Districts of a state embracing a number of counties may form similar societies. Delegates from the county or district societies meet and constitute the state medical society. The meeting of the state societies, as a rule, are held yearly, and those of the county or district societies oftener, as may be desired. All have officers common to deliberative bodies and the proceedings of their meetings are governed by the rules of parliamentary law. Associations having for their object the consideration of certain special subjects, as public health, the cure of inebriates, the influence of climate on health, the use of the microscope, etc., are classed as medical societies, and hold annual meetings for the transaction of business. Delegates from state or county or district societies meet, and constitute the National Medical Association, whose sessions are yearly. In all these associations the members pay annual dues, and their proceedings are published in book or pamphlet form, and distributed to the members.

Of the medical associations formed during the eighteenth century in the United States may be named the following, with date of organization:

New Jersey State Medical Society	1766
Massachusetts Medical Society	1781
College of Physicians of Philadelphia	1787
Medical and Chirurgical Faculty of Medicine	1799
Medical Society of Delaware	1789
Medical Society of South Carolina	1789
New Hampshire Medical Society	1791
Connecticut State Medical Society	1792

Of the national associations the chief is the American Medical Association, organized in New York in 1846. Membership in this society is obtained by any member of a state or county medical society recognized by the association. The annual dues are five dollars. This body is so large, and the range of topics considered so wide, that it resolves itself into sections for the better transaction of business, members attending those sections in which they are most interested. Another very important society is the Association of American Medical Colleges, organized in 1890, having for its object the full consideration of medical education in the United States. Its members are, for the most part, the faculties of medical colleges in the United States. It is this association which recently has formulated courses of study and of lectures for the medical colleges of the United States, with a view to a greater uniformity in methods of teaching and the higher qualifications of medical graduates. The following list of national associations, with date of organization, will best show the diversity of schools and subjects of paramount interest at the present time:

American Academy of Medicine	1876
American Anti-Vivisection Society	1883
American Association for the Study and Cure of Inebriates	1870
American Association of Genito-Urinary Surgeons	1886
American Association of Obstetricians and Gynæcologists	1888
American Association of Orificial Surgeons	1888
American Association of Physio-Medical Physicians and Surgeons	1883
American Branch of the English Society for Physical Research	1890
American Climatological Association	1883
American Dermatological Association	1876
American Electro-Therapeutic Association	1891
American Gynæcological Society	1876
American Health-Resort Association	1891
American Institute of Homœopathy	1844
American Laryngological Association	1878
American Medical Association	1846
American Medico-Psychological Association	1892
American Neurological Association	1875
American Obstetrical Society	1885
American Ophthalmological Society	1864
American Orthopædic Association	1887
American Otological Society	1868
American Pædiatric Society	1888
American Physiological Society	1887
American Postal Microscopical Club	1875
American Public Health Association	1872
American Rhinological Association	1883
American Society of Microscopists	1878
American Surgical Association	1880
American Volunteer Corps	1888
Association of Acting Assistant Surgeons, United States Army	1888
Association of American Anatomists	1888
Association of American Colleges	1890
Association of American Physicians	1886
Association of Medical Officers of American Institutions for Idiotic and Feeble-Minded	1876
Association of Military Surgeons of the National Guard, United States	1891
Conference of State Medical Examining and Licensing Boards	1891
International Hahnemannian Association	1880
International Medical Congress	
International Medical Missionary Society	1881
Medical Guild of the Misericordia	
Mississippi Valley Medical Association	1875
National Association of Homœopathic Medical Examiners	1891
National Association of Members of Committees of Medical Legislation	1891
National Association of Railway Surgeons	1888
National Board of Health (organized by act of Congress)	1879
National Conference of State Boards of Health	1884
National Eclectic Medical Association	1848
New England Psychological Society	1875
Pan-American Medical Congress	1891
Rocky Mountain Medical Association	1871
Sanitary Council of the Mississippi Valley	1879
Southern Homœopathic Medical Association	1885
Southern Surgical and Gynæcological Association	1887
United States Medical Practitioners' Protective Alliance	1890
Western Academy of Homœopathy	1875
Western Association of Obstetricians and Gynæcologists	1891

MEDICAL EDUCATION IN THE UNITED STATES. The changes and improvements in medical teaching in the United States during the past one hundred years are not less important than the results which have been achieved in the

prosecution of the study of medical science. When we contemplate the larger medical schools of to-day, richly provided, as they are, with every kind of appliance to facilitate teaching, with departments excellently arranged for the study of normal and pathological anatomy and physiology, and provided with the necessary apparatus and instruments, their well-stocked museums and numerous departments for clinical teaching—when we look at all these, and establish a comparison with the inadequate beginnings which were made in such things in the last century, we recognize at once how much has been done since then. At the present time all the appliances and methods in use are considered indispensable for the proper and thorough teaching of medical students, whereas then they were entirely wanting, or at least but poorly employed. There is now another form of instruction. Practical demonstrations have become, by degrees, of supreme importance, while theoretical lectures have, by degrees, nearly been abandoned. Division of labor has assumed a definite form. The lecturer concerns himself exclusively with one or two subjects, and thus attains the ability and skill of a virtuoso. Dissection, once a felony, is now lawful. Subjects no longer are stolen from the graveyards under cover of darkness, but come to the schools under the sanction of the state in the full light of day. The development of electrical science and apparatus has contributed to the diagnosis of diseases and their localization in the body, while modern chemistry has given to the physician efficient medicines in palatable form, and to the surgeon a sure and safe means of operating quickly and without pain. The discovery of the cause of specific diseases by bacilli, and a rational treatment by inoculation or by antiseptics, has revolutionized the theory and the practice of medicine. In no other form of instruction is there such a radical and wide departure from the precedents of a hundred years ago as is now found in the schools for medical education in the United States.

The earliest medical practitioners in the American colonies were the medical officers of the companies by whose agency the colonies were established. The first permanent resident physician in the United States was Dr. John Pot (1610), in Virginia. Dr. Samuel Fuller, who came over on the *Mayflower* in 1620, was the first physician in New England. The supply for the medical profession of the young colonies was twofold, foreign and domestic. During the seventeenth century many educated European physicians emigrated to America, as Dr. John Clark of Boston in 1638, Dr. Thomas Thacher in 1635, and Dr. Robert Child in 1644. Of the domestic practitioners a certain number, after acquiring at home some preliminary education, went to Europe to study medicine in the European universities, as William Shippen and Benjamin Rush, who studied at Edinburgh; William Hunter of Newport, who was a pupil, in London, of his famous cousin, John Hunter; and James Smith of New York, whose medical training was gained at Leyden. Many of the better physicians of the later colonial period, after taking degrees in America, went to Europe for greater advantages, as did Dr. Valentine Mott. But by far the larger number of domestic physicians were educated by means of the defective school facilities of the colonies themselves. Medical students from fourteen to eighteen years of age entered the office of some doctor, under apprenticeship for the term of three to seven years. They learned to grind drugs, mix powders, make ointments, plasters, tinctures, etc., to extract teeth, to cup and to bleed, and to perform minor operations in surgery. In time the student accompanied his master to the bedside of the patients, to feel the pulse or look at a furred tongue. Possibly an amputated limb may have been given him to dissect. At the expiration of the apprenticeship, with a certificate from his preceptor that he had attended faithfully to his studies, etc., the student set up in business for himself and plunged into the duties of his profession—to salivate, to physic and to bleed his patients, as was the practice of that time. Doctors in those days bought herbs and drugs at the general stores and compounded their own medicines, which were carried in saddle-bags. The practice of medicine was, of course, pure empiricism—the newly-fledged doctor simply imitated his teacher, unless he were gifted with a rare talent for original investigation.

Though the anatomical lectures of Giles Firman, delivered at Harvard College prior to 1647, were the first public medical instruction in the United States, the earliest medical school was the institution now known as the Medical Department of the University of Pennsylvania, founded by Dr. John Morgan and William Shippen at Philadelphia in 1765. This was followed speedily by the school now known as the College of Physicians and Surgeons, under the charter of King's College, New York City, in 1767. The medical department of Harvard University was founded in 1783, the College of Philadelphia in 1790, and the medical school of Dartmouth in 1798. These five schools were the only ones in the United States prior to the nineteenth century. By degrees all the states of the Union have established colleges and universities, in 1836 as many as 79, 38 of which enjoyed the right to "make doctors"; down to 1876 there were 59 authorized to confer degrees. The following are the more important medical colleges that have been established during the present century, with date of organization:

Medical Department of University of Maryland, Baltimore	1811
Medical Department of Yale University, New Haven, Connecticut	1814
Bowdoin College and Medical School, Brunswick, Maine	1820
Medical College of Ohio, Cincinnati	1819
Medical School of State of South Carolinia	1825
Columbian University, Washington, District of Columbia	1822
Jefferson Medical College, Philadelphia, Pennsylvania	1826
University of Georgia, Augusta	1829

Tulane University, New Orleans, Louisiana	1834
University of Louisville, Louisville, Kentucky	1837
Rush Medical College, Chicago	1837
Albany Medical College	1839
Medical College of Virginia	1839
Missouri Medical College, St. Louis, Missouri	1840
University of City of New York	1841
St. Louis Medical College	1842
Cleveland Medical College	1842
Eclectic Medical Institute, Cincinnati, Ohio	1843
Hahnemann Medical College, Philadelphia, Pennsylvania	1843
University of Buffalo	1846
Homœopathic Hospital College, Cleveland, Ohio	1849
Woman's Medical College, Philadelphia, Pennsylvania	1850
University of Michigan, Ann Arbor, Michigan	1850
Miami Medical College, Cincinnati, Ohio	1852
University of Vermont, Burlington	1854
Atlanta Medical College, Atlanta, Georgia	1856
Medical College of Alabama, Mobile	1859
Northwestern University, Chicago Medical College	1859
Long Island College Hospital, Brooklyn	1859
Hahnemann Medical College, Chicago	1859
Bellevue Hospital College, New York	1861
Homœopathic Medical College, New York	1861
Eclectic Medical College of New York	1865
Bennett College, Chicago	1868
Louisville Medical College, Louisville, Kentucky	1870
University of Iowa, Iowa City	1870
College of Physicians and Surgeons, Baltimore	1872
Boston University	1873
Vanderbilt University, Nashville, Tennessee	1874
Chicago Homœopathic Medical College	1876
University of Tennessee, Nashville, Tennessee	1877
St. Louis College of Physicians and Surgeons	1879
Iowa Medical College (Drake University) Des Moines	1881
Minnesota Hospital College, Minneapolis	1881
New York Polyclinic	1882
New York Post-Graduate Medical School	1882
College of Physicians and Surgeons, Chicago	1882
Cooper Medical College, San Francisco	1882
Detroit College of Medicine	1885

There have been organized, in the United States, nearly three hundred medical colleges, of which, in 1891, only 135 were in existence. Seven of these are colleges exclusively for women, and 45 for both sexes. In 1890 there were registered 14,884 students, and the number graduating was 4,492.

The medical schools of the United States, like the hospitals to which they are attached, are, as a rule, private enterprises, the state neither paying for their maintenance nor contributing to their support, and consequently exerting little, if any, influence on their organization and administration. Several physicians living in the same locality unite for the purpose of imparting instruction in medicine, but chiefly for the increased practice and emoluments that come to them by virtue of their connection with such an institution. Until within the last twenty years no one made inquiry as to the qualifications of their graduates. The schools accordingly differed greatly in merit; some, as the New York College of Physicians, the Bellevue Hospital College of New York, and the Rush Medical College of Chicago, enjoying a high reputation, while others occupied a low position intellectually and morally, and a few trafficked in doctor's diplomas; some had large, well-ventilated lecture-rooms, laboratories, museums, libraries, etc., while others were poorly equipped. Medical schools connected with state institutions of learning, and so supported wholly or in part by tax, were better equipped in every way, were more independent of patronage, and could consequently demand higher standards for admission and graduation. Until recently, applicants were admitted to lectures without examination even in the rudiments of a common-school education; they were obliged to attend two courses of lectures; but, as the scheme of study was not graded at all, the same lectures were heard twice, and an examination for a degree was seldom severe, especially when from $25 to $50 was paid for the diploma. The fear that tests for admission, or a graded curriculum, or an extended course of study, would result in a loss of pupils and decreased income long kept those who deplored the low state of medical proficiency from taking measures to improve it. The creation, by law, of state boards of health to inquire into the qualifications of practicing physicians, and to license such as may be found qualified, has been a potent factor in raising the standards of medical schools in the United States. Another strong influence has been the action of the American Medical College Association in adopting rules for the admission of colleges to membership in the American Medical Association, whereby all colleges were to have a graded course of study, covering a period of not less than three courses of lectures of six months each; oral and written examinations for all students; a thorough course of laboratory instruction in chemistry, histology and pathology; an entrance examination in English composition; translations of easy Latin prose; higher arithmetic; the elements of physics, botany, chemistry, physiology and biology; geography; and history. This association also adopted a college course of study which required the teaching of anatomy, physiology, chemistry, materia medica, theory and practice of medicine, pathology, surgery, obstetrics, and gynæcology, hygiene, medical jurisprudence, dissection (two courses), two terms of hospital and clinical instruction, diseases of women and children, dermatology, ophthalmology, otology, laryngology, dental pathology and surgery, toxicology, etc.

By the better part of the profession higher standards of medical education had long been contemplated and desired. But in the old and regular schools, tradition and inertia were hard to overcome. However, in 1853, the homœopaths introduced a graded course into the Penn University of Philadelphia, and the school ceased to exist ten years later. In 1869 it was adopted in the Hahnemann College of Philadelphia, and in 1872 in the New York Homœopathic College. The Women's College next adopted it, and in 1868 the Women's Medical College of the New York Infirmary. Soon after, the Woman's Medical College of Pennsylvania, in Philadelphia, followed. Among the "regulars," the Chicago Medical College of the Northwestern University was using a graded course in 1866, and Harvard led the way in the East in 1871, and suffered no loss

in numbers, while making a gain in matriculates previously educated in liberal studies. Six years later, the University of Pennsylvania enrolled itself in the same ranks, with like results. The course of lectures on which attendance is now required for a degree is, in the better class of colleges, substantially that recommended by the American Medical College Association. Of the 135 colleges in the United States in 1891, 129 exacted certain educational qualifications for entrance, and 85 required three or more courses of lectures as a condition of graduation. One hundred and twenty-three had a chair of hygiene, and 119 one of medical jurisprudence. The average duration of lecture terms was 26 weeks each. In those institutions which have adopted real tests of fair literary attainments as a condition of entrance, the result has been an increase of matriculates possessing diplomas from colleges and schools of science. Thus the ratio of such matriculates to the whole number of students at Yale, Harvard, Columbia College, New York, the University of New York and the University of Pennsylvania was about one third. Sixteen of the regular schools furnishing the information necessary for the estimate were attended by about 2,000 students, of which 23 per cent, or nearly three times the average, had received previous degrees in letters or science.

Nearly all the states now prohibit a physician from practicing medicine without first obtaining a license from some official board of censors. These boards are appointed in various ways, in some states by the governors, in others by judges of the courts, or by state medical societies. The requirements of these boards are also various; by some, a diploma from a medical college is all that is necessary, but those who are not graduates must submit themselves to examination. In some cases ten years' practice is considered equivalent to the possession of a diploma. Connecticut contents herself with imposing upon strolling characters a license fee of $20 a day for each day of practice in the state, which is virtually prohibitory. Most of the legislation concerning the regulation of the practice of medicine is within the last twenty years, and it is to be regretted that much of it is a dead letter. But the existence of legislation of this character indicates a sense of the importance of the subject, and serves to elevate the standard of medical teaching. The tendency of the statutes is in the direction of holding medical societies responsible for the qualifications of their own members. These societies comprise the best men in a profession which is by no means devoid of scholars highly accomplished in letters and science. In all the larger cities of the United States, which have medical colleges, the work of the colleges is supplemented in what are called post-graduate schools. In these schools clinical instruction is afforded, and the students can pursue certain definite studies, or prepare themselves as "specialists." The need of such schools has long been felt, and they are well patronized, not only by students just graduated, but also by doctors from the rural districts, who feel the need of "brushing up" and of "keeping up with the times."

The admission of women to lectures on medicine was opposed strongly at first by the medical profession. The refusal of the established schools to open their doors to women led to the organization of a Woman's Medical College in Philadelphia in 1850. Its teachers and pupils being denied access to the hospitals of that city, the friends of the institution, in 1861, established in its neighborhood a Woman's Hospital, which now receives over 4,500 patients annually. In 1852 a society was incorporated in Boston for the training of midwives, nurses and female physicians; and in New York a dispensary was opened in 1854, which, three years later, was converted into a hospital. In this institution clinical privileges were obtained, which elsewhere were denied to women. At the present day the right of a woman to practice medicine in the United States seldom is questioned, and colleges for their instruction in medical science are to be found in Chicago, New York, Boston, Philadelphia and other cities.

It may be of interest to note that practical anatomy was taught in the colonies to some extent in the middle of the eighteenth century, subjects for dissection being the bodies of executed criminals. There were secret dissections at Harvard College in 1771, 12 years before the organization of its medical department. No special professor of physiology existed in any medical school in the United States during the eighteenth century. Midwifery during the first half of the century was wholly in the hands of the women. In 1767 the first regular professor of obstetrics was appointed in King's College, New York. In 1789, Dr. George Buchanan of Baltimore delivered the first course of lectures on the diseases of women and children. The first law to regulate the practice of medicine and surgery in the colonies was passed in New York in 1760. This example was followed by New Jersey in 1772. Up to the Revolutionary War, medical literature in the colonies consisted of but one medical book, three reprints, and about twenty pamphlets. Literary contributions were mostly in the form of *Transactions* of medical societies. The earliest medical journal in the United States was *The Medical Repository* (1771–1828), followed by the *Philadelphia Medical Museum* in 1804. The number of medical journals in the United States in 1893 was 232.

MEDICAL LAKE, in Spokane County, Washington, so called from the peculiar character of its water. A good quality of soap is made from the water by condensation, and it contains ingredients said to be very valuable in the cure of rheumatism, catarrh and skin and stomach complaints.—The village of MEDICAL LAKE takes its name from the above body of water, and is situated 12 miles W.S.W. of Spokane, on the Seattle, Lake Shore and Eastern and the Northern Pacific

railroads. It has large hotels for the accommodation of the many health-seekers who come here, and excellent granite is quarried and shipped. It is the seat of the Eastern Washington Hospital for the Insane. Pop. 1890, 617; 1900, 516.

MEDICINE LODGE, a city and the capital of Barber County, southern Kansas, on the Atchison, Topeka and Santa Fé railroad, 90 miles S.W. of Wichita. It is the center of a grain and stock-growing region. Population 1900, 917.

MEDICK (*Medicago*), same as ALFALFA. See FORAGE PLANTS OF THE UNITED STATES, in these Supplements.

MEDILL, JOSEPH, journalist, was born at St. John, New Brunswick, Canada, on April 6, 1823, came to the United States, and was admitted to the bar in 1846. In 1855 he settled in Chicago and became one of the proprietors of *The Chicago Tribune*, of which he was editor-in-chief from 1863 to 1869, and from 1874 to 1899. Under his direction *The Tribune* became one of the most powerful journals in America west of the Alleghany Mountains. He was mayor of Chicago for eight months after the great fire of 1871, and did much for the rebuilding of the city. He was influential in politics, and interested in all public affairs. He died on March 16, 1899. W.F.J.

JOSEPH MEDILL.

MEDINA, a village of Orleans County, New York, in the northwestern part of the state. It has numerous industries, with water power from Oak Orchard Creek, and is reached by the Erie canal and the New York Central and Hudson River railroad. It gives its name to a fine building sandstone quarried in the vicinity. It is twelve miles south of Lake Ontario, and thirty-two northeast of Buffalo. Its population in 1900 was 4,716. W.F.J.

MEDINA, a post village and the capital of Medina County, central-northern Ohio, 34 miles S. of Cleveland, on the Cleveland, Lorain and Wheeling and the Northern Ohio railroads. It contains a normal school, flour, saw and planing mills, a foundry and other manufactories. Population, 1890, 2,073; 1900, 2,232.

MEDÎNET HÂBU, a village of Upper Egypt, opposite Karnak, the site of splendid ruins of a temple built by Thutmosis III, the so-called pavilion of the king, and the grand sepulchral temple of Ramses III. G.A.S.

MEDING, OSKAR, a German novelist, known by his assumed name of GREGOR SAMAROW; born at Königsberg, studied law at Königsberg, Berlin and Heidelberg, and entered the Prussian civil service, being employed in the Bureau of Publications under Manteuffel. In 1859 he entered the Hanoverian service, becoming in 1863 councilor of state and referendary in the ministry. In 1866 he was sent by King George to the elector of Hesse to influence the latter to accept the treaty of neutrality offered by Prussia, and accompanied the king during the following campaign and afterward to Vienna. In 1867 he was in Paris in the interest of the Welf Legion. In 1870 he became reconciled to the Prussian Government, when he retired from politics, lived two years at Cannstatt and in Switzerland, and in 1873 settled in Berlin. In 1879 he took up his residence near Hanover, returning to Charlottenburg in 1900, where he died, July 11, 1903. He wrote *Um Scepter und Kronen* (1872); *Europäische Minen und Gegenminen* (1874); *Kreuz und Schwert* (1875); *Der Todesgruss der Legionen* (1874); *Im Banne der Irridenta* (1890); *Krieg oder Frieden; Transvaal* (1897); *Im Exil* (1881–84); *Aus Vergangenen Tagen; Under Fremdem Willen* (1894); *Under dem Weissen Adler* (1892); *An den Ufern des Ganges* (1893). G.A.S.

MEDULLA OBLONGATA. See ANATOMY, Vol. I, pp. 764–765.

MEDULLA SPINALIS OR SPINAL CORD. See ANATOMY, Vol. I, pp. 760, 761.

MEDUM OR MEYDOOM. See EGYPT, Vol. VII, p. 671.

MEDUSÆ. See HYDROZOA, Vol. XII, pp. 583–587.

MEEK, ALEXANDER BEAUFORT, an American jurist and author; born in Columbia, S. Car., July 17, 1814. He was graduated from the University of Alabama in 1833 and was admitted to the bar two years later. He then entered the army and served in the Seminole War in 1836; was attorney-general of Alabama in 1836, and judge of Tuscaloosa County, 1842–44. In 1839 he was the editor of *The Southron*, a popular journal of that period. While a member of the state legislature in 1853 he established the free-school system of Alabama. He wrote a legal digest (1842); also *The Red Eagle* (1855); *Songs and Poems of the South* (1857); *Romantic Passages in Southwestern History* (1857). His best known poem is *The Charge at Balaklave*. He died in Columbus, Mississippi, November 30, 1865. W.M.C.

MEEK, FIELDING BRADFORD, geologist, was born at Madison, Iowa, on December 10, 1817. Until 1848 he was engaged in mercantile pursuits, but then followed his earlier inclinations and entered the service of the United States Geological Survey. After surveying the Upper Mississippi Valley he became associated with James Hall (q. v.) in his palæontological survey of New York state. He also worked much in Missouri and Dakota. In 1858 he settled in Washington, D. C., and was thereafter chiefly engaged in examing the fossils and other specimens secured by various government exploring parties. He wrote a number of valuable reports on his own work and his observations of the work of others. He died at Washington on December 28, 1876. W.F.J.

MEGABYZOS. See PERSIA, Vol. XVIII, p. 585.

MEGALICHTHYS, a genus of extinct ganoid fishes, found in Carboniferous strata in Europe. The remains consist largely of big bony plates and immense teeth. They are believed to have been of great size.

MEGALOSAURUS. See Reptiles, Vol. XX, p. 456; Geology, Vol. X, p. 315.

MEGANTIC LAKE, Canada, in southern Quebec between Beauce and Compton counties, near the Maine (U. S.) border, is about fifteen miles long with a maximum width of 3 miles. It drains through the Chaudière River into the St. Lawrence. Megantic village at its north end, on the Canadian Pacific R. R., is a summer resort. C. L. S.

MEGASTHENA, an order, arranged by Dana, including the large mammals below man, which possess superior mental and physical strength. The group included the quadrumanous, the carnivorous, the herbivorous and the cetaceous mammals. This was the second of the four orders of mammals, according to Dana. The order is equivalent to Owen's second order, *Gyrencephala*.

MEGASTHENES, an ancient Greek historian. See India, Vol. XII, pp. 826–827.

MEGERLE, Ulrich. See Abraham, a Sancta-Clara, Vol. I, p. 56.

MEHEMET ALI. See Egypt, Vol. VII, pp. 659–666.

MEIGGS, Henry, merchant and railroad builder, was born at Catskill, N. Y., on July 7, 1811, and was engaged for some years in the lumber and other businesses in New York and San Francisco. In the great business panic of 1854 he failed with liabilities of a million dollars, and thereupon went with his family to South America to begin life anew. He became a contractor for building bridges and other works on railroads in Chili, and was highly successful, making profits there of more than half a million dollars. Thence he went to Peru, where he built three railroads, including one through the Andes which for daring and successful engineering is entitled to rank among the wonders of the world. In such work he amassed a splendid fortune, so that he was able to return to the United States, pay in full all his old obligations, and give large sums of money to charities. He died in Peru on September 29, 1877. W. F. J.

MEIGS, James Aitkin, physician, was born in Philadelphia on July 31, 1829, and was educated at the Jefferson Medical College in that city. He was for years a professor in the Pennsylvania Medical College, and in the Philadelphia College of Medicine, and was a high authority on craniology. He died on November 9, 1879.

W. F. J.

MEIGS, John, educator, was born at Pottstown, Penn., on August 31, 1852, and was educated at Lafayette College, where he was afterward instructor and assistant professor. Since 1876 he has been head-master of the Hill School, at Pottstown, Penn. He is also a director of the Union Theological Seminary, in New York.

W. F. J.

MEIGS, Montgomery Cunningham, soldier, was born at Augusta, Ga., on May 13, 1816, of New England ancestry, and was graduated from West Point in 1836. He entered the engineer service, and was engaged in river and harbor improvements on the Delaware and Mississippi rivers, and in the construction of Fort Wayne, on the Detroit River, and of Fort Montgomery on Lake Champlain. He planned and built the Potomac aqueduct at Washington, including the famous Cabin John and Rock Creek bridges. He also had charge of the enlargement of the Capitol at Washington and the building of its great dome. In the Civil War he led the expedition which saved Fort Pickens at Pensacola from capture, and was then quartermaster-general of the army, with the rank of brigadier-general, until his retirement for age in 1882. As quartermaster-general, furnishing supplies to the army, he had the expending of nearly $2,000,000,000, and did it with probably less loss from waste or fraud than ever before attended the administration of such a sum. After the war he was concerned with the erection of the War Department building, the Pensions building, and the National Museum, at Washington. He was a regent of the Smithsonian Institution, and a member of the National Academy of Sciences. He died on January 2, 1892. W. F. J.

MEIGS, Return Jonathan, an American patriot and soldier; born in Middletown, Conn., Dec. 17, 1734. In the Revolutionary War he accompanied Arnold on his expedition against Quebec, where he was taken prisoner. He led a brilliant expedition against the British at Sag Harbor on Long Island, for which he received the thanks of Congress and a sword, and also took a distinguished part in the capture of Stony Point under General Wayne. In 1788 he emigrated to Ohio, and established himself at Marietta. In 1801 he was appointed by President Jefferson Indian agent of the Cherokees, among whom he passed the remainder of his life. He died in Georgia, January 28, 1823.

W. M. C.

MEIGS, Return Jonathan, Jr., an American soldier and politician; born in Middletown, Conn., in November, 1765. He was graduated from Yale in 1786, removed to Marietta, Ohio, with his father in 1788. He was appointed Chief Justice of the Ohio Supreme Court in 1803 and was a judge in Louisiana, 1805–06; and in Michigan for the two years following. After being senator from Ohio, 1808–10, he was governor of that state for the next four years, in which period he was an active supporter of the war measures of 1812–14. He was postmaster-general of the United States from 1814 to 1823. He died in Marietta, Ohio, March 29, 1824.

W. M. C.

MEIKONG. See Mekong, Vol. XV, 840–841.

MEILHAC, Henri, dramatist; was born in Paris, France, on February 23, 1831, and was educated at the Lyceum of Louis the Great. He

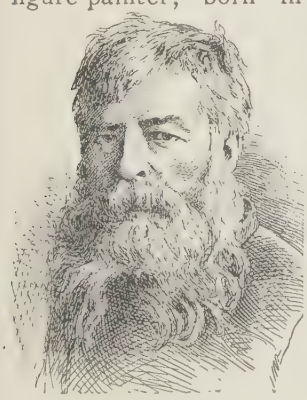
became a journalist and artist, and produced some dramatic pieces with little success. About 1860, however, he began to collaborate with Ludovic Halévy, and together they produced some of the most brilliant successes of the modern French stage. A number of his dramas were used by Jacques Offenbach as librettos for his *opera-bouffes*. Among his best known works written with Halévy are *What Pleases the Man* (1860); *La Belle Hélène* (1865); *Barbe Bleu* (1866); *The Grand Duchess of Gerolstein* (1867); *La Perichole* (1869); *Frou-Frou* (1869); *La Cigale* (1870), etc. Hortense Schneider, Sarah Bernhardt and other eminent singers and actresses have been identified with prominent dramatic and musical parts of his creation, and most of his works have been frequently produced in the United States with much success. He died in Paris on July 6, 1897. W.F.J.

MEINAM OR MENAM, a river. See SIAM, Vol. XXI, p. 890.

MEISSEN, HEINRICH VON. See FRAUENLOB, Vol. IX, p. 640.

MEISSNER, ALFRED, poet; born in Teplitz, Germany, in 1822. His liberal sentiments led him to a voluntary exile from his country, he dwelling at Paris in 1847 and subsequently in London. In 1850 he fixed his residence in Prague, and after 1869 dwelt in Bregenz. He was the author of numerous poetical works, including *Poems* (1845); *Ziska*, an epic poem (1846); *The Son of Atta Troll*, a comic epic (1850), and many dramatic works, of which may be named *The Wife of Urie*, *Reginald Armstrong* or *The Power of Gold*, and *The Pretender of York*, tragedies. His acquaintance with Heine at Paris led to the volume *Henry Heine: Souvenirs*. He also wrote some charming books of travel *Across Sardinia* (1859); *Road-Making* (1867), and *History of My Life* (1884), a fragment of autobiography. He died at Bregenz in 1885. G.J.H.

MEISSONIER, JEAN LOUIS ERNEST, a French figure-painter; born in Lyons, Feb. 21, 1815. When he was still a child his father established a pharmacy in Paris, and the son, having resolved upon art as a profession, studied under Jules Potier and Léon Cogniet. His drawings were praised by Johannot, and about 1833–34 he was employed by Curmer, the publisher, on designs for the Royaument Bible and other works. He first made a distinct mark in 1838 and by his illustrations to *Paul and Virginia* and the *Chaumière Indienne*. In 1834 he began to contribute to the Salon. Two years later he exhibited the first of his various groups of *Chess-Players*. It was followed by a long series of elaborate and successful *genre* pictures, in which, with the most careful and finished execution and with the most perfect verisimilitude of costume and local coloring, the artist depicted the civil and military life of the seventeenth and eighteenth centuries, passing to subjects of *genre* or history taken from the nineteenth century. Among the most celebrated of his military scenes may be named *La Rixe*, presented to the Prince of Wales by Napoleon III. Besides this is his famous Napoleonic series, of which *1807* was sold to a New York gentleman for $60,000, and presented to the Museum of Art, and *1814*, in 1890, changed hands in Paris for $100,000. He also executed some striking portraits. In all, over 400 of his paintings are known to exist, about 60 of which are owned in the United States. Finally, we may refer to his design for the decoration of the Panthéon, "the apotheosis of France," the cartoons of which were exhibited to the commission in 1889. He became a member of the Institute in 1861, commander of the Legion of Honor in 1867, and Grand Cross in 1889. He was a member of the principal art academies of Europe, and received various honors and orders at international exhibitions and from the sovereigns of various countries. Died in Paris, Jan. 31, 1891.



J. L. E. MEISSONIER.

MEISTERSÄNGER OR MASTERSINGERS. See GERMANY, Vol. X, p. 471; and MUSIC, Vol. XVII, p. 91.

MEJIA, TOMÀS, a Mexican soldier and politician; born in Guanajuanto, in 1812, of native Indian parents. He was known to his countrymen as "The King of the Mountains." In 1856 he headed a rebellion against the government and later carried on a guerrilla warfare against President Juarez. He fought as a general in command of Mexican troops in the war with the United States, after which he became a trusted supporter of Maximilian. At the overthrow of the Empire, he was thrown into prison, and was executed at Queretaro, June 19, 1867. W.M.C.

MEKHITAR. See MECHITARISTS, Vol. XV, p. 784.

MEKLONG, a river and town. See SIAM, Vol. XXI, pp. 890, 892.

MELAMET, DAVID, composer; born in Memel, Prussia. At the early age of twelve years he became a member of a concert company, and made a tour of Russia. He studied composition in Berlin under Tiersch, Wuerst, and Becker. In 1888 he became director of the Germania Mannerchor of New York city, and in 1889 succeeded Professor Fincke. Later he wrote the prize cantata, *Columbus*, which was rendered Oct. 11, 1892, in the 7th Regiment Armory. G.J.H.

MELAMPUS, OF ARGOS, a famous physician of ancient Greece; the son of Amythaon and Eidomene; said by one authority to have been born about 705; and by another writer about 690. In Grecian mythology he is said to have been the first mortal endowed with the gift of prophecy and who first practiced the medical art. It is claimed he introduced the worship of Bacchus into Greece. He is reputed to have cured the sons of King Prætus, who were insane, by administering hellebore, which was therefore called

Melampodium. Heredotus is authority for the statement that Melampus was sent for from Piso to cure the women of Argos, who had been strongly stricken with insanity, and demanded no less a reward for his services than a gift of the entire kingdom. He finally compromised by accepting a third of the kingdom after having effected the desired cure. He also was known as a most renowned soothsayer and magician, and as a reward for bringing the oxen of Iphichus to Neleus, the latter gave his daughter in marriage, Pero, to Bias, a younger brother of Melampus. See also NELEUS, Vol. XVII, p. 329. W.M.C.

MELANCHOLIA. See INSANITY, Vol. XIII, pp. 110–112.

MELANIIDÆ, a large family of fresh-water, gastropodous molluscs, found in the rivers of warm climates all over the world. Some of the shells are long, slender, and acute, while others are quite globular. R.W.C.

MELANITE. See MINERALOGY; Vol. XVI, p. 429.

MELAZGHERD, a village in Asiatic Turkey, situated near the source of the Euphrates not far from Mount Ararat. It contained 2,000 inhabitants, about equally divided between Moslems and Christians. It was totally destroyed and almost the entire population swallowed up by an earthquake April 2, 1903.

MELBA, MADAME NELLIE (HELEN PORTER ARMSTRONG), an Australian operatic singer; born in Melbourne, May 19, 1865. She is the daughter of David Mitchell, and was married in 1882 to Charles Nisbett Frederick Armstrong, son of Sir Archibald Armstrong. She began to learn music at three years of age, and played and sang in public in Melbourne when only six. In 1886, she removed with her husband and parents to London, and made one or two essays at concert singing. After a course of study she appeared as *Gilda* at the Brussels Opera. Later she was engaged for the Grand Opera, Paris, where she appeared with M. Lasalle, the famous baritone, in *Hamlet*. In 1888 she appeared in London at Covent Garden in the opera of *Lucia di Lammermoor*. The performance was praised by the critics, who were more enthusiastic when she sang with Jean de Reszke in Gounod's *Romeo et Juliette*. Amongst the rôles which she played during this and succeeding seasons at Covent Garden were *Lucia*, *Lakne*, *Elsa*, *Marguerite*, and *Esmeralda*. Madame Melba had the advantage of being personally instructed by M. Gounod in the interpretation of his music, especially in the rôles of *Juliette* and *Marguerite*. In 1891, she sang at St. Petersburg, with the brothers De Reszke, by special command of the Czar. In 1892 she again appeared at Covent Garden and later appeared with the brothers De Reszke in the United States. W.M.C.

MELEAGER. See ANTHOLOGY, Vol. II, pp. 92, 93.

MELEAGER, a Greek hero of mythology, the son of Quenens, king of Calydon. He distinguished himself in the Argonautic expedition and more particularly in the Calydonian hunt, killed the bear and gave its skin to his beloved Atalanta, as a high token of regard. He was especially distinguished for throwing the javelin. The fates declared that he would die as soon as a certain piece of wood then on fire was burned up; whereupon his mother snatched the log from the fire and extinguished it, but after Meleager had slain his maternal uncles, his mother threw the brand on the fire again and he died. The death of Meleager was a favorite subject with early artists. The famous picture of Charles le Brun, depicting the scene, is in the Musee Imperiale in Paris. W.M.C.

MELEAGRIS. See GUINEA-FOWL, Vol. XI, p. 234; and TURKEY, Vol. XXIII, pp. 699, 700.

MELETEUS. See JEROME, Vol. XIII, pp. 640–641; and CHRYSOSTOM, Vol. V, pp. 660–662.

MELGAREJO, MARIA. See BOLIVIA, Vol. IV, p. 17.

MELICERTES, a son of Athamas and Ino. His father, by command of Juno, had married Nephele, by whom he became the father of Phrixus and Helle, but he was secretly in love with the mortal Ino, by whom he begot Learchus and Melicertes. Having thus incurred the rage of Juno, Athamas was overcome with madness and slew Learchus. Ino, seized with grief, threw herself with Melicertes into the sea, where both were changed into marine divinities, the former becoming Leucothea and the latter Palæmon. The body of Melicertes was washed upon the shores of the Corinthian Isthmus, and found by his uncle, Sisyphus, who instituted the Isthmian games in honor of the deified Palæmon. Children were sacrificed to him on the island of Tenedos.

MELIKOFF OR LORIS-MELIKOFF, MIKHAIL TARIELOWITCH TAINOFF, COUNT, a Russian general of Armenian descent; born at Lori, Jan. 1, 1826; received his education at the Lazareff Institute. At an early age he began his military career, joining the Hussars at St. Petersburg. At the time of the Crimean War he had attained to the rank of colonel, and commanded a light cavalry regiment. He was present at the capture of Kars, and was appointed commandant of that town, with the rank of general. He also took part in the military operations in the Caucasus, and after the peace he was sent, as governor, to Vladi-Kavkas, in Circassia, in 1860. Some years afterward he obtained an unlimited leave of absence on account of the state of his health. He visited France, resided for some time at Paris, went next to Germany, and was staying at Wiesbaden when the declaration of war by Russia against Turkey recalled him to active service. He was appointed adjutant-general to the Grand Duke Michael, the imperial lieutenant commanding-in-chief the army of the Caucasus. It was, in fact, General Loris-Melikoff who directed all the military operations in a country with which no one was more intimately acquainted than himself. To him was due the capture of Ardaham by the Russian troops, May 17, 1877. He was subsequently governor of Astrakhan and of Kharkhoff, where he distinguished himself in the former place by his measures against

the plague, and in the latter against the nihilists. After the attempt to wreck the imperial palace with dynamite, Feb. 17, 1880, Loris-Melikoff was placed in charge of an extraordinary commission for the regulation of the empire, with almost unlimited powers. He was Minister of the Interior (1880–81). He died in Nice, Dec. 24, 1888.

MELILOT, a common name of species of *Melilotus*, or sweet clover, of the family *Leguminosæ*. They are natives of the Old World, but are cultivated and have run wild in the United States. They are sweet-scented herbs, with small yellow or white flowers in slender racemes, pinnately three-foliolate leaves, and small globular wrinkled pods. More or less used as forage plants.

MÉLINE, Felix Jules, a French statesman; born in Remiremont, May 20, 1838; studied law at Paris and became a court reporter. He was elected a member of the Commune, but did not accept the office. After the establishment of the republic he was elected to the Assembly (1872) and held his seat until his appointment to the position of under-secretary of the Ministry of the Interior, a post which he held for only one year. Subsequent to this he became a member of the tariff commission and distinguished himself by his defense of a high protective policy. In 1881 he was returned to the Assembly, holding his seat until appointed Minister of Agriculture in 1883. He resigned in 1885 and was again elected to the Assembly. He was elected president of the Chamber of Deputies to succeed Floquet and held the position till the end of the session. He was elected to the succeeding Assemblies, in which he kept up his struggle for a protective tariff, until called upon by President Faure, April 27, 1896, to form a new Cabinet.

MELIPHOGIDÆ. See Honey-eater, Vol. XII, p. 142.

MELL, Patrick Hues, educator, was born at Walthourville, Georgia, on July 19, 1814, studied at Amherst College, became a teacher, and in 1842 became a Baptist preacher and also professor of ancient languages at Mercer University. From 1856 to 1878 he was a professor in the Georgia State University, and in 1878 became chancellor of that institution. He was a Confederate officer in the Civil War. He died on January 26, 1888. W. F. J.

MELL, Patrick Hues, Jr., naturalist, son of Patrick Hues Mell (q. v.), was born at Penfield, Georgia, on May 24, 1850, and was graduated from the University of Georgia, was state chemist of Georgia in 1874–77, professor in the Polytechnic Institute of Alabama in 1878–1902, and since 1902 has been president of Clemson College, South Carolina. W. F. J.

MELODEON. See Harmonium, Vol. XI, pp. 431–433.

MELODRAMA, the name originally applied to that kind of dramatic performance in which declamation is interrupted from time to time by instrumental music. The name, however, which first was applied to the opera by its inventor, Ottavio Rinuccini, has come to designate a romantic play, depending mainly on sensational incidents, thrilling situations and an effective dénouement. Great sums are spent in the staging of such pieces, and the costumes, scenery and mechanical effects are often very striking.

MELODY. See Music, Vol. XVII, p. 84.

MELPOMENE. See Muses, Vol. XVII, p. 81.

MELROSE, a town of Middlesex County, eastern Massachusetts, nine miles N. of Boston, on the Boston and Maine railroad. It has manufactories of boots and shoes, furniture, silver-polish and sewing-machine needles. Its public library has over 11,000 volumes. Population 1890, 8,519; 1900, 12,962.

MELTING-POINT. The following are some of the most important melting-points, which may also be regarded as the freezing-points of the corresponding liquids:

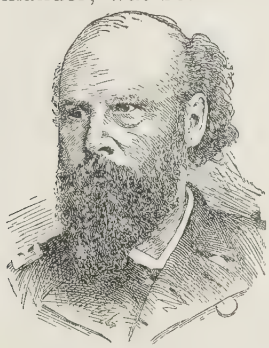
	Degrees, Centigrade.	Degrees, Fahrenheit.
Alcohol, pure	—130	—202
Hydrobromic acid	—120	—184
Strongest sulphuric acid	—116	—177
Sulphuretted hydrogen	—85	—121
Ammonia	—75	—103
Sulphurous acid	—75	—103
Chloride	—75	—103
Carbonic acid	—70	—94
Chloroform	—70	—94
Mercury	—39–38	—38–39
Olive and linseed oil	—20	—4
Bromide	—7–3	×19–86
Ice	—0	—32
Glacial acetic acid	17	62–6
Phosphorus	44–2	111
Potassium	62–5	144–5
Sodium	95–6	204
Iodine	113	235
Sulphur	115	239
Lithium	180	356
Solder, about	180	356
Tin	228	442
Bismuth	267	513
Lead	334	633
Antimony	430	806
Zinc	450	842
Magnesium, about	750	1,382*
Bronze, about	900	1,652
Silver, about	1,000	1,832
Brass, about	1,015	2,860
Copper, about	1,100	1,012
Iron, white cast, about	1,100	2,012
Iron, gray cast, about	1,225	2,237
Gold, pure, about	1,250	2,282
Steel, about	1,350	2,462
Soft iron, about	1,550	2,822
Manganese, about	1,600	2,912
Platinum, about	1,800	3,272
Iridium, about	1,950	3,542
Osmium, about	2,500	4,532

* Melting-points beyond about 900° or 1,000° F. are merely approximate and relative.

MELVILLE, the name of an island, a sound and a peninsula in the polar regions of North America. The island is 200 miles long by 130 miles broad, and is situated between long. 105° and 117° W. It was discovered in 1819 by Captain Parry. Its surface is low and undulating. The sound, about 250 miles long by 200 broad, extends S.E. of the island and communicates with the Arctic Ocean and with Baffin Bay. The peninsula is separated from the sound and

island, being much farther to the southeast. It extends north-northeast from the mainland toward Cockburn Island, and separates the Gulf of Boothia and Fox Channel.

MELVILLE, George Wallace, naval commander, was born in New York City on January 10, 1841, and was educated at the Brooklyn, New York, Polytechnic Institute. He entered the navy as an assistant engineer in 861, and served through the Civil War. He went with De Long (q. v.) on the *Jeannette* Arctic expedition, and was the hero of that desperate enterprise. He led his boat's crew to safety through indescribable perils and hardships, and he promptly headed the relief expedition which went to the Siberian wilderness in quest of the other members of the expedition, or their remains. He also went with the relieving party in succor of the Greely expedition. Altogether he thus made three Arctic voyages, for his valor and achievements on which Congress voted him a gold medal and advanced him fifteen numbers on the navy list. From August, 1887, to 1903, he was chief engineer of the United States navy, and in that place contributed more than almost any other one man to the building of the new navy. Under his administration designs were prepared for 120 ships, aggregating 700,000 horse power. He designed the famous triple screw cruisers, *Columbia* and *Minneapolis*, and invented many valuable mechanical devices. He was made rear-admiral in 1899, and in 1903 went upon the retired list. He wrote *In the Lena Delta*, a thrilling account of the *Jeannette* expedition, and the article on the United States Navy in this volume, page 180. W.F.J.



GEORGE W. MELVILLE.

MELVILLE, Herman, author, was born in New York City on August 1, 1819, and after receiving a common school education went to sea as a cabin boy at the age of eighteen. Five years later, in 1842, he deserted a whaling vessel, at the Marquesas Islands, and for some months was a captive among the natives at Typee Valley. On his escape he returned to New York and engaged in authorship. His first books, *Typee* and *Omoo*, were based upon his adventures in the Marquesas Islands. Later he wrote *Mardi*, *White Jacket*, *Moby Dick*, and other works, and several volumes of poems. All his writings are marked with much power and originality, and some of them deserve to rank among the classics of American literature. He married a daughter of Chief Justice Shaw of Massachusetts in 1847, and for many years lived at Pittsfield, Mass. In later years he again made his home in New York, and died there on September 28, 1891. W.F.J.

MELVILLE, Sir James, a Scotch courtier; born at Halhill, Fifeshire, in 1530; for some time page to Queen Mary of Scotland. In 1564 he was sent to the English court with friendly messages to Elizabeth concerning the approaching marriage with Darnley. Two years later he acted as interim secretary to the Scotch queen, and was an unwilling confidant of Darnley, who remarked to him about the murderers of Rizzio, "As they have brewed, so let them drink." The same year he was sent to announce the birth of James VI of Scotland to the court of England. In 1567 he remonstrated with Mary in connection with her marriage with Bothwell and received the answer that "matters were not that far agaitwart." He was afterward carried with her a captive to Dunbar, and negotiated the surrender of Edinburgh Castle. He was asked to undertake a mission to Denmark (1595) in connection with the proposed marriage of James VI to the younger daughter of the King, but he escaped from the duty. He received the last instructions of Queen Mary on the scaffold. He died Nov. 1, 1607.

MEMBRANE, a term in anatomy and physiology indicating any soft texture made up of tissues, as the membranes of the brain, mucous membranes, serous membranes, or the fœtal membranes.

MEMMINGER, Charles Gustavus, lawyer, was born in Würtemburg, Germany, on January 7, 1803, was left an orphan in infancy at Charleston, S. C., and was cared for by Thomas Bennett, governor of that state. He was graduated from South Carolina College in 1820, and in 1825 was admitted to the bar. In 1831 he vigorously opposed the Nullification movement (see p. 266, this volume) and wrote a satire upon it in imitation of the Biblical style. For many years he was a member of the legislature of South Carolina, and of its finance committee. Despite his record against Nullification he was a leader in the Secession movement in 1860, and upon the organization of the Confederate government was made its secretary of the treasury. After the Civil War he lived in retirement, and died on March 7, 1888. W.F.J.

MEMNONIUM. See Egypt, Vol. VII, p. 675.

MEMORY. See Psychology. Vol. XX, pp. 65–71.

MEMPHIS, a town and the capital of Scotland County, northeastern Missouri, 42 miles W. of Keokuk, Iowa, on the Keokuk and Western railroad. It is in a stock-raising and agricultural region, has several mills, and carriage and wagon, plow, stave, ax-handle and furniture factories. Some coal is mined. Dairy and farm products and stock are shipped largely. Pop. 1890, 1,780; 1900, 2,195.

MEMPHIS, a city of Tennessee, situated on the Illinois Central, the Kansas City, Fort Scott and Memphis, the Louisville and Nashville, the St. Louis, Iron Mountain and Southern and several other railroads. It is in a region devoted mainly to raising cotton, corn, wheat, wool and live-stock. The city is growing in manufacturing activity. Cotton goods are the principal articles of manufacture, the Pioneer cotton-mills having 6,176 spindles, consuming over 1,000,000 pounds of cotton per annum. During the decade from 1890 to 1900 the manufacturing industries were doubled; in 1900, 658 reported to the Census Bureau; these had an aggregate

capital of over $11,175,000, and produced over $17,848,000 worth of merchandise that year, and the business of the city exceeded $130,000,000. Memphis is well supplied with public and private schools and colleges and charitable institutions. Ample means have been employed, since the reorganization of the city in 1879 under a "legislative council," for keeping it in a healthful condition. Population 1890, 64,495; 1900, 102,320. See also MEMPHIS, Vol. XV, p. 856.

MEMPHREMAGOG, LAKE, a long, narrow body of water, extending from Vermont into Quebec in a curved line, but generally northward in direction. It is 35 miles long and between 2 and 5 miles wide. From the edge of the lake rises Mount Orford, 3,500 feet above its surface. It abounds in fish, and is popular as a summer resort.

MENABREA, LUIGI FEDERICO, MARQUIS DE VALDORA, COUNT, Italian statesman; born in Chambery, Savoy, Sept. 4, 1809; graduated as a C. E. and Ph. D. from the University of Turin, and was appointed professor of engineering in the Military Academy at Turin. In 1861 he was made a Senator, a lieutenant-general, and a count, and in 1876 he served as ambassador to England; and in 1882–92 as ambassador to France. He was an accomplished mathematician and engineer, and published *Le Génie Italien dans la Campagne d' Ancone et de la Basse-Italie* (1866). Died May 25, 1896.

MENAI STRAIT. See ANGLESEA, Vol. II, p. 28.

ME-NAM. See SIAM, Vol. XXI, p. 890.

MENASHA, a city and railroad center of Winnebago County, southeastern central Wisconsin, 18 miles N. of Oshkosh, on the Wabash, the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads. It has abundant water-power, used in a number of manufactories, including a large chair factory, iron, wooden-ware, hub and spoke works, machine-shops, and paper, woolen and saw mills. Pop. 1890, 4,581; 1900, 5,589.

MENDEL'S LAW, a law in biology named after its discoverer whereby it is assumed that the plant breeder may be able to produce a desired hybrid type with the same degree of accuracy as the chemist makes a compound. Mendel made his theory public in a periodical at Brünn, Austria, in 1865, but it was little known or considered until De Vries, in 1900, published a similar treatise, using technical terms proposed by Mendel and gave some of his own researches to confirm the theory. Soon after De Vries had made known the results of his investigations, Correns of Germany and Bateson of England came out with explanations of the same law. Meanwhile W. J. Spillman of the United States Department of Agriculture, from whose dissertation on the subject this information has been gleaned, was working on hybrid wheats, and announced the law (but not the theory) in 1901. The knowledge of the discovery only became general about the first of the year 1903. If subsequent investigations should confirm its utility as those made up to that time did, its importance to scientific biology can hardly be overestimated. A summary of Mendel's law is that every possible combination of the parent characters occurs in the second and later generations of a hybrid, and that each combination appears in a definite proportion of the individuals. To explain the theory deduced by Mendel, an illustration is taken from the crossing of two varieties of wheat — one bearded, the other smooth. When the hybrid thus produced forms its germ cells, pollen and ovules, the characters of the two parents separate, the beard-producing character passing into part of the pollen grains and part of the ovules, the smooth-head character of the other parent passing into the remaining germ cells. On the average, half the pollen and half the ovules will receive the character of one parent, the other half that of the other. With dihybrids, fixed types unlike either parent may be secured in the third generation. Perhaps no science will receive greater benefit from the application of the law than that of pomology. A. R. R.

MENDENHALL, THOMAS CORWIN, an American scientist, born in Hanoverton, Ohio, Oct. 4, 1841. He was educated in the public schools and at the Ohio State University, where in 1873 he became professor of physics and mechanics. From 1878 to 1881, he was professor of physics in the Imperial University of Japan. He returned to America in 1882; was president of the Rose Polytechnic Institute, 1886; superintendent of the Coast and Geodetic Survey, 1889; member of the United States Lighthouse Board, 1893; and was chosen president of the Worcester Polytechnic Institute in 1894. He is a member of various scientific societies. He has written *A Century of Electricity* (1887). W.M.C.

MENDES, a city and deity. See EGYPT, Vol. VII, pp. 621, 622.

MENDIBURU, MANUEL DE. See PERU, Vol. XVIII, p. 689.

MENDOCINO, CAPE, the westernmost extremity of the state of California, in Humboldt County, 210 miles north by west from San Francisco. It is at the western end of the Humboldt Base Line, and lies in lat. 40° 26′ 24″ N., and long. 124° 23′ 27″ W. The headland is surmounted with a lighthouse. W.F.J.

MENDOTA, a city of La Salle County, Illinois, in the central-northern part of the state. It lies on the Illinois Central and Chicago, Burlington and Quincy railroads, eighty miles west by south from Chicago, in an agricultural and coal mining country, and has extensive coal and iron works. It is the seat of several academies. Its population in 1900 was 3,736. W.F.J.

MENDOZA, HURTADO DE. See PERU, Vol. XVIII, p. 691.

MENDOZA, GARCIA (1535–1609). See ARGENTINE REPUBLIC, Vol. II, p. 431.

MENDOZA, INIGO LOPEZ. See SANTILLANA, Vol. XXI, p. 315.

MENDOZA, PEDRO DE. See ARGENTINE REPUBLIC, Vol. II, p. 431.

MENENDEZ DE AVILES, Spanish conquistador; was born in Spain in 1519, and rose to eminence under Philip II. Commissioned as governor of Florida, he founded the city of St.

Augustine, the oldest settlement in the United States. There the French Huguenots of Fort Caroline, on the St. John's River, made a futile attack upon him, in revenge for which he attacked them and massacred nearly all of them. He also butchered nearly two hundred of the crews of some shipwrecked French ships. Afterward he was governor of Cuba. He was finally recalled to Spain and died there in 1574, leaving a hateful memory. W.F.J.

MENENDEZ Y PELAYO, MARCELINO, a Spanish author; born in Santander, Spain, 1857; graduated from the Madrid University and took a long post-graduate course at Barcelona and Paris. He showed decided antagonism toward Germanism in philosophical matters and great love for the literary masters of the Latin races. His defense of the Inquisition in his book *Historia de los Heterodoxos Españoles* (3 vols., 1880–82) excited the indignant ire of liberals, both in Spain and abroad. He is in his best vein in purely literary themes, which he treats with firm hand and acute judgment. Such are his *Estudios de Crítica Literaria* (1884); *Calderon y su Teatro* (1884); *Historia de las Ideas Estéticas en España* (5 vols., 1884–91). Poetry of excellent quality is found in his *Odas, Epistolas y Tragedias* (1883). He edited a superb collection of the works of Lope de Vega, and collected a most valuable *Antologia de Poetas Liricos Castellanos* (4 vols., 1893) with excellent introductions. He also essayed a translation of Horace's Odes.

MENEPTAH OR MENPTAH. See EGYPT, Vol. VII, pp. 641–642.

MENES. See EGYPT, Vol. VII, p. 634.

MENKARA OR MENKAURA. See EGYPT, Vol. VII, p. 635.

MENNONITES IN THE UNITED STATES, a religious body of which a general account is given in Vol. XVI, pp. 15–16.

The Russian Mennonites, in 1871, were deprived of their immunity from military service, and prepared for emigration, large numbers coming to the United States, and settling in Kansas, Nebraska, Minnesota and the Dakotas. Considerable numbers also went to Canada, attracted by the liberal offers of the Dominion Parliament, and formed two settlements, one on the Rat River reservation and one on both banks of the Red River, in Manitoba, the two settlements numbering about ten thousand. The Mennonites are mostly agriculturists, frugal, thrifty and moral. They believe that the New Testament is the only rule of faith; deny original sin; condemn infant baptism; refuse to take official oaths; generally baptize believers by pouring water on their heads while kneeling; observe foot-washing; believe in close communion; and use the ban to punish unworthy members. Their pastors, for the most part, serve without pay, and in several branches the number of ministers is considerably greater than the number of churches, there being sometimes two or more pastors in one church. The pastors are elected by lot from the congregation. Deacons, who care for the poor and sick and take charge of the parish, are chosen the same way. Bishops or elders are elected to take charge of a district having several congregations and ministers. The bishops, deacons and lay delegates form conferences for mutual aid and sympathy. Difficulties between members are settled by arbitration, those refusing to arbitrate being excommunicated. There are twelve branches of the body in the United States, the *Mennonite Church;* the *Amish* or followers of Jacob Amen, who separated over a dispute on church discipline and were often called "Hookers" because of their refusal to wear buttons on their clothing; the *Brüderhof Mennonites,* founded by Jacob Huter in 1536, and who are "communists"; the *Old Amish,* or strict adherents to ancient customs; the *Apostolic,* a branch of the Amish; the *Reformed Mennonites,* separatists under Jacob Herr in 1812; *General Conference Mennonites,* who originated in 1848 under John Oberholtzer, believe in an educated ministry and in worldly conformity, and who, in 1901, had 138 ministers, 79 churches, and 10,395 members, and support an orphans' home at Bluffton, Ohio; *Church of God in Christ,* or "Quaker" Mennonites, who originated in 1859; *Old* (Wisler) *Mennonites,* originated in Elkhart County, Indiana, about 1870; *Bundes Conferenz der Brüder-gemeinde,* who originated in Russia, and are immersionists; *Defenseless Mennonites,* another branch of the Amish; and *Mennonite Brethren in Christ,* who originated about 1879, are Methodistic in discipline, have open communion and optional forms of baptism. They number about 3,000 communicants, sustain an orphans' home at Berlin, Ontario, and a foreign mission at Wuhu, China. In 1901 these 12 branches reported an aggregate of 1,187 ministers, 696 churches, and 58,328 communicants. The largest were the Mennonite Church, with 22,443 members, and the Amish, with 13,051 members. A close affiliation exists between these two branches.

MENOMINEE, a city and the capital of Menominee County, the southernmost point of the northern peninsula of Michigan, 48 miles N.N.E. of Green Bay City, Wisconsin, on Green Bay, at the mouth of the Menominee River, the largest city of the northern peninsula. Its lumber-mills have a capacity of 275,000,000 feet per annum. Iron-mining, marble-quarrying and lumber-shipping are the chief industries. Population 1890, 10,630; 1900, 12,818.

MENOMONIE, a city and the capital of Dunn County, central western Wisconsin, 23 miles W. of Eau Claire, on Cedar River, and on the Chicago, Milwaukee and St. Paul and the Chicago, St. Paul, Minneapolis and Omaha railroads. It is extensively engaged in the fur trade, has manufactories of iron, machinery, carriages, sashes and blinds, shingles and lumber, besides flour-mills and brickyards, and enjoys excellent educational facilities. Population 1890, 5,491; 1900, 5,655.

MENOMONIES INDIANS. See INDIANS, Vol. XII, pp. 870, 873.

MENOPOMA. See AMPHIBIA, Vol. I, pp. 665–666.

MENSTRUATION. See REPRODUCTION, Vol. XX, p. 420.

MENTANA. See ITALY, Vol. XIII, p. 501.

MENU OR MANU. See BRAHMANISM, Vol. IV, p. 186; and SANSKRIT, Vol. XXI, p. 302.

MENURA. See LYRE-BIRD, Vol. XV, pp. 117–118.

MENZALEH OR MENZELEH LAKE. See EGYPT, Vol. VII, p. 618.

MENZEL, ADOLF FRIEDRICH ERDMAN, a German painter, lithographer, illustrator and engraver; born in Breslau, Silesia, Dec. 8, 1815; educated at the Berlin Art Academy, and by his father, a distinguished lithographer. He soon took an independent course, publishing, in 1838, his *Five Senses*, a series of original lithographs. He attempted painting in oils later in life, devoting himself to *genre* compositions, many of which proved highly popular. He is known also for his drawings and oil-paintings illustrative of the times of Frederick the Great and Emperor William I, pictures characterized by historical fidelity, strong realistic conception, originality and humor. His *Adam and Eve; Christ Among the Doctors;* and *Christ Expelling the Money-Changers*, are also notable pictures. In 1885 a special exhibition of his leading works was held in Paris. He was made a knight of the Legion of Honor in 1867, and a member of the Berlin Academy of Fine Arts (1853). Died Feb. 9, 1905.

MERCANTILE AGENCY, an institution founded in the interest of manufacturers, merchants, bankers and others to furnish information as to the financial standing, business reputation and credit of individuals, firms and corporations engaged in mercantile or industrial enterprise.

Commerce proceeds on the lines of knowledge, and this is one of the principal reasons why commercial progress was so limited until the middle of the present century, for previous to that time comparatively little was known of the laws governing commercial transactions in distant countries, while reciprocal information between the various communities had not determined the measure of the responsibility of individuals. Commerce secured its increased development, not alone by reason of increased facilities, but because of the advancement of commercial credit throughout the civilized world. The modern mercantile agency, as the term is understood in the United States, was first established in New York City, about 1840, and from its inception has held a distinctive place as compared with similar organizations in other sections of the world, although embracing among its functions some of the work of the Scottish Trade Protection Societies, formed about the middle of the last century. Those organizations gathered and reported, for the protection of members, information respecting bankruptcies, insolvencies and the like, but they did not conceive the practicability of gathering data for the establishment of commercial credits. The vast and rapid increase of population, and the extension of the railroad, postal and telegrapic communication, brought new conditions and created the necessity for an organization to do promptly and systematically for many what had formerly been imperfectly done by the individual merchant or banker receiving or extending credit. The necessity for a system which would obtain local and general information as to the character and personal responsibility of individuals, firms or corporations, and make such information available in all business centers, became apparent. It was under such conditions that the mercantile agency system was first conceived. At the outset many difficulties presented themselves, and many doubts were expressed as to the possibility of successfully dealing with subject matters so important and yet so delicate and personal. The unprecedented growth of cities, towns and villages over the widespread area of the North American continent rendered it more difficult to establish and maintain a satisfactory system than in other sections of the world, but the necessities for such a system were greater, for obvious reasons. Since its foundation it has been active in determining its resources, establishing its principles and demonstrating its ability to do well, in the general interests, what had previously been done by individual effort, and it has so fulfilled its obligations and justified the confidence placed in it that it is recognized as one of the important factors in the world of commerce. It acts as a clearing-house for information affecting mercantile affairs and mercantile credit. It procures and disseminates information so broadly as to enable the solvent merchant of any community to purchase his supplies in the most advantageous markets of the world. The element of time, always of prime importance, is also of great value, for credit must be, as a rule, promptly determined.

Every person entering into business engagements is weighed in the scale of public opinion; to accurately reflect that opinion without prejudice is the assumed duty of the agency. The information so collated estimates the character, ability and apparent success with which the undertaking is conducted, the capital invested, and such other information as may have a direct bearing or influence on credit. It is not *ex parte*, for opportunity is afforded every individual, firm or corporation to make statement as to their own financial condition. From the information so obtained and formulated is deduced what are known and recognized as "commercial ratings." The names of the various merchants, with the ratings, are issued quarterly, in book-form, and are classified, first by states and provinces, then by cities and towns, all arranged in alphabetical order. These volumes, covering the United States and Canada, embrace a million and a quarter of distinctive business organizations, and yet so simply are they classified that a reference can be had with as much readiness as the finding of a subject in an encyclopædia.

The service of the agency is primarily in the interests of the subscriber, who, for a moderate consideration, receives, upon application, information desired, and also the use, for a limited time, of the current printed volumes containing the names and ratings of those reported. The great agencies comprehend in their work the entire list of names of persons and business organizations known and recognized in the mercantile community, and to accomplish this they have established offices in all commercial centers throughout the continent. A manufacturer in a small city or town in the interior has every facility for learning the standing of all dealers in his particular line throughout the continent as readily as the merchant or banker of the

large city, while the credit of the local dealer is established in all the markets from which he could advantageously make his purchases, credit being as important to the seller as to the buyer. The merchant of the interior finds, through this system, his credit known in every city, while every distributer of merchandise finds it a simple, convenient and quick reference for ascertaining the standing of buyers, near or remote. The whole commercial world is practically embraced by these institutions. Their archives are a mine of valuable information, and contain the detailed history of millions of individuals, firms and corporations now or previously engaged in active business, besides hundreds of thousands of others who have an interest in or who may be more or less responsible for those who assume the direction of mercantile organization. Europe and America, Australia and the Orient are thus brought into close touch commercially, and have at their command, in convenient form, the result of these investigations.

To the worthy solvent dealer, in whatever section, the reports and ratings are practically "letters of credit," valuable to the extent of their means and ability; while to those who are irresponsible and unreliable the institution is like the law to evil-doers—a constant restraint.

C. F. Clark.

MERCANTILE LAW, a branch of the law which pertains to the rights, duties and liabilities of those engaged in mercantile transactions. This branch of the law is also known as the law-merchant. It is made up mostly from rules and practices among merchants in their business dealings with each other, which have gradually developed from custom into law, and is founded upon principles of equity and justice which usage has established for convenience to regulate the dealings of merchants with each other. The rules have become of application, not alone to merchants, but to all who may be engaged in any mercantile transaction. There is no other branch of law in which so great uniformity prevails throughout the civilized world. This results, no doubt, from the greatly increased business intercourse which now exists between the different nations, which renders it exceedingly convenient, and almost necessary, that the rules of commercial transactions be practically the same throughout the world. In the various states of the United States many statutory rules are established, but in most cases they are merely formulations of rules already existing. Minor differences frequently occur, but the laws are essentially alike in principle. For the various principles of mercantile law, see the articles, in these Supplements, under title of the different classes of commercial property, relations and transactions.

MERCAPTANS, the organic sulphydrates, or thio-alcohols, i.e., alcohols with oxygen replaced by sulphur. Their odors are, as a rule, very disagreeable and persistent. They are almost insoluble in water, and generally form salts, especially with mercury; hence the name. Ethyl mercaptan is used to make sulphonal and other soporifics.

MERCATOR'S PROJECTION. See Map, Vol. XV, pp. 527–528.

MERCED, a city and the capital of Merced County, central California, 120 miles E.S.E. of San Francisco, on the Bear Creek and the Southern Pacific railroad. It is in an irrigated agricultural and fruit-growing region, and has a large shipping-trade in wheat and other products. It has wagon-works, a foundry, planing-mills and a large fruit-cannery. Population 1890, 2,009; 1900, 1,969.

MERCER, a post borough and the capital of Mercer County, northwestern Pennsylvania, 56 miles N. of Pittsburg, on the Pittsburg, Shenango and Lake Erie and the Western New York and Pennsylvania railroads. It is in a fertile farming section, devoted mostly to stock-raising. Coal is mined, and natural gas is abundant. It is one of the largest horse-markets of western Pennsylvania, and manufactures iron, flour, lumber, etc., Population 1890, 2,138; 1900, 1,804.

MERCER, Hugh, an American soldier; born in Aberdeen, Scotland, in 1721. He was graduated from Aberdeen University, and served as an assistant surgeon in the army of the Young Pretender at the battle of Culloden. Emigrating in 1747 to America, he settled in Virginia. In 1755 he volunteered in the expedition led by Gen. Braddock against Fort Duquesne (now Pittsburg, Pa.). At the outbreak of the Revolution he joined the Continental Army and obtained the rank of brigadier-general. He subsequently joined General Washington on his retreat through New Jersey, and rendered valuable assistance at the Battle of Trenton. In the succeeding night attack against the British at Princeton, he was mortally wounded and died January 12, 1777, in the hands of the enemy. Mercer County, New Jersey, was named in his honor.

W.M.C.

MERCER, Jesse, an American Baptist clergyman, born in Halifax County, N. Car., Dec. 16, 1769. He received a common school education and in 1789 was ordained as a Baptist clergyman. For upward of forty years he was the recognized leader of the Southern Baptists, and for eighteen years was successively elected president of the Baptist General Conference. He was the founder of *The Christian Index*, which after successful publication for some years he presented as a gift to the Southern Baptists. He also founded the Mercer University, to which he donated $50,000 at his death, which occurred in Washington, Georgia, September 6, 1841.

W.M.C.

MERCERSBURG, a post borough of Franklin County, central southern Pennsylvania, 15 miles S.W. of Chambersburg, on the Cumberland Valley railroad. It contains Mercersburg College and a theological seminary of the German Reformed Church, and was formerly the seat of Marshall College. Population 1900, 956.

MERCHANT TAYLORS' SCHOOL, an institution of learning founded in 1561 in the city of London, England, by Sir Thomas Whyte, founder of St. John's College, Oxford, and the Court of the Merchant Taylors' Company. It is still governed by the latter corporation; is a day-school of five

hundred pupils, established in its own building on Charterhouse Square; has in its gift 39 college scholarships, each from £86 to £100 for from 5 to 7 years; of these, 26 apply to Oxford and 9 to Cambridge.

MERCIA. See ENGLAND, Vol. VIII, pp. 245–255.

MERCIÉ, MARIE JEAN ANTOINE, a French sculptor; born in Toulouse, France, Oct. 30, 1845; a pupil of Falguière and Jouffroy; was awarded the first Prix de Rome by the Paris School of Fine Arts in 1868, exhibiting at the Salon the same year. During his stay at the French Art Academy in Rome (where winners of this prize spend four years, entirely at government expense), he exhibited a *David* (plaster) and a *Dalila* (bronze) which were greatly praised. His magnificent emblematic bronze group *Vae Victis* was the sensation of the Salon of 1874, and has been erected in one of the Parisian squares. He afterward produced a succession of admirable works which place him in the front rank of modern sculptors. He was elected a member of the Institute and a professor at the National School of Fine Arts, Paris. Among other noted works are *Le Génie des Arts* (for the Tuileries); *Gloria Victis; Junon Vaincue; Quand Même* (for the unconquered city of Belfort); *Victor Hugo* (bust); *Thiers* (statue); Bas-reliefs for the tombs of Arago and Michelet, etc.

MERCIER, HONORÉ, statesman, was born at St. Athanase, Quebec, Canada, on October 15, 1840. He became a lawyer and editor of *Le Courier*, and in 1872 entered the House of Commons (Quebec). In 1878–79 he was solicitor-general of Quebec, and in 1883 became leader of the Liberal party in Quebec. He became prime minister of Quebec in 1887. On charges of misappropriation his ministry was dismissed in 1891, and in 1892 he was indicted for conspiracy to defraud the province, but was acquitted. He died on October 30, 1894. W.F.J.

MERCUR, JAMES, military officer; born in Pennsylvania; was graduated at the United States Military Academy in 1866, and commissioned 2d lieutenant of engineers, June 18; was promoted 1st lieutenant, March 7, 1867, and captain, Dec. 9, 1875. He was first assigned to duty on the survey for the northern lakes; was next appointed a professor; and in 1876–81 assisted General Newton in the work of removing Hallet's Point and Flood Rock at Hell Gate. He was supervisor of the engineering work under General Newton during the latter's absence in Europe. In 1884 he was appointed professor at the Military Academy. He died in West Point, April 23, 1896. G.J.H.

MERCURY, a planet. See ASTRONOMY, Vol. II, pp. 679–681; and in these Supplements.

MERCY, SISTERS OF. This order, or sisterhood, was founded in 1827, in Dublin, Ireland, by Catherine McAuley. She was born in 1787, was adopted by Callahan of Corlock house and became the heir to his immense fortune. She purchased a site in lower Baggot street, Dublin, and there erected the house of "Our Blessed Lady of Mercy," in 1827. She with two companions entered the Presentation Convent of George's Hill and received the religious dress in December, 1829. They returned to Baggot street in 1830, and in Jan., 1831, the religious dress was given to the six sisters who had had charge of the establishment. The order was founded with the approbation of Murray, the archbishop, and soon became so flourishing as to extend to England in 1839, to Newfoundland in 1842, to the United States in 1843, to Australia in 1845, and afterward to Scotland, New Zealand, and South America. The title of the order is taken from that of Peter Nolasco and the rule is nearly the same as that of the Presentation nuns. The sisters take a vow to devote themselves for life to the service of the poor, sick, and ignorant. W.R.B.

MEREDITH, GEORGE, author; born in Hampshire, England, in 1828; received his early education in his native place, and after studying for a time in Germany, turned his attention to the profession of law. He, however, had a strong taste for literature and abandoned the practice of law in order to devote his time entirely to literary pursuits. He became a proficient linguist and was widely read in the literature of many nations, especially in that of Germany. Being in rather poor financial circumstances at the beginning of his literary career, he established himself with Swinburne and Rossetti, who were in similar circumstances, in a house known as Tudor House in Cheyne Walk, Chelsea. The same house was also made famous as the residence of George Eliot during the latter part of her life. Here it was that Swinburne wrote an essay on William Blake, the first series of his *Poems and Ballads*, and the famous drama, *Atalanta*. In another room of the same building Rossetti worked on his celebrated picture of *Dante and Beatrice* and produced some of his greatest poems. During the same period Meredith was working on a condensation of his poems and prose. The first of this famous trio to establish a home for himself was Meredith, and soon after the other two were in a position to support separate establishments. The works of Meredith have not been as widely read as many other authors, owing to his style, which is intricate but classical. In November, 1892, he was elected president of the London Society of Authors to succeed Lord Tennyson. His most famous books, which have become classic literature, are *The Egoist; Richard Feverel*, and *Rhoda Fleming*. His other publications include *Poems; The Shaving of Shagpat; Farina; Evan Harrington; Modern Love; Poems of the English Roadside; Mary Bertraud; Emilia in England; Vittoria; The Adventures of Harry Richmond; Beauchamp's Career; The Tragic Comedians; Poems*

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and Lyrics of the Joy of Earth; Diana of the Crossways; Ballads and Poems of Tragic Life; A Reading of Earth; One of Our Conquerors; Empty Purse; Jump to Glory Jane; Lord Ormont and His Aminta; The Amazing Marriage; The Tale of Chloe; The House on the Beach; The Case of General Ople and Lady Camper, and *Comedy and the Uses of the Comic Spirit.* G.P.V.

MEREDITH, Sir William Ralph, a Canadian jurist; born in Middlesex County, Ontario, March 31, 1840. He was graduated from the Toronto University, studied law and was elected a member of the Ontario legislature. In 1899 he was made a LL.D. He was appointed Queen's Counsel in 1785, and in 1894 was elevated to the bench as chief justice of the Common Pleas Division of the Ontario High Court of Justice. He is chancellor of the University of Toronto. W.M.C.

MERGENTHALER, Ottmar, inventor of the linotype typesetting machine (which see in these Supplements, p. 1889), was born in Würtemberg, Germany, in 1854, and died at Baltimore, Md., Oct. 28, 1899. In 1886, after many years spent in devising the linotype, he was successful in putting his invention on the market. Since then, the machine has been improved, and is now in successful operation in many large book-publishing and newspaper offices of the country. It may be said, indeed, to have revolutionized printing.

MERIDEN, a city of Connecticut. In 1900 260 manufactories reported to the Census Bureau. These had a capital of $16,700,000, and turned out $13,485,640 worth of products. The Meriden Britannia Company employs over 1,500 hands and has an annual output valued at $3,000,000. Other manufactories of Meriden include silver-plated ware, hardware, cutlery, steel pens, glassware, cabinet organs, malleable iron, iron and brass castings and machinery. Pop. 1890, 21,652; 1900, 24,296. See, also, Meriden, Vol. XVI, p. 41.

MERIDIAN, a city and the capital and a railroad junction of Lauderdale County, central eastern Mississippi, 87 miles E. of Jackson, on the Southern, the New Orleans and Northeastern and three other railroads, the second city in population in the state. It is in a cotton-growing region, and has two seminaries for girls, machine-shops, steam corn-mills, and manufactories of furniture, doors, sashes and blinds, plows, and cotton yarn, and two national banks with a capital of $230,000. Population 1890, 10,624; 1900, 14,050.

MERIVALE, Charles, clergyman; born in Devonshire, England, March 8, 1808; son of John Herman Merivale; was dean of Ely from 1869 till his death. He was most widely known for his historical writings, which included *History of the Romans under the Empire; General History of Rome; Lectures on Early Church History.* He died in Ely, Dec. 27, 1893. G.J.H.

MERIVALE, Herman, statesman; born in Devonshire, England, Nov. 8, 1806; brother of Charles Merivale; was professor of political economy at Oxford in 1837–42; under-secretary of state for the colonies in 1848–60; and afterward perpetual under-secretary for India. His publications include *Colonization and Colonies* (2 vols., 1841), and *Historical Studies* (1865). He died in London, Feb. 9, 1874. G.J.H.

MERIVALE, Herman Charles, dramatist; born in London in 1839; son of Herman Merivale; was educated for the law and practiced till 1879. His publications include the plays *All for Her* (1874), and *Forget Me Not* (1879); the novels *Faucit of Balliol* (1882), and *Binko's Blues* (1884); the poems *The White Pilgrim* (1883), and the tragedy *Florien* (1884). G.J.H.

MERIVALE, John Herman, *littérateur;* born in Exeter, England, in 1779; grandson of the Rev. Samuel Merivale; was educated at St. John's College, Cambridge, but took no degree because of his dissenting belief; was called to the bar in 1805, and practiced in the court of chancery; and was a commissioner in bankruptcy from the inauguration of the newly-organized system in 1831 till his death. He contributed a large proportion of the translations contained in the *Collections from the Greek Anthology* (1813) and published the poem *Orlando in Roncesvalles* (1814); *Poems, Original and Translated* (1841), and translations of the *Minor Poems of Schiller.* He died in April, 1844. G.J.H.

MERLE, a bird. See Ousel, Vol. XVIII, 78–79.

MERLE, Hugues, a French painter; born in St. Marcellin, France, March 1, 1823; a pupil of Léon Cogniet. As a painter of children, either in *genre* pictures or in groups, he ranked among the best modern artists. His *Beggar* (1861) is in the Luxembourg. Among his best examples owned in America are *A Mad Woman; Asking Alms; The Young Christian; A Girl with a Child in Her Arms; Mother and Her Children; The Scarlet Letter* (painted at Hawthorne's request, and now in the Walters gallery, Baltimore); and *Chasing the Butterfly.* Died in Paris, March 15, 1881.

MERLIN, a bird. See Falcon, Vol. IX, p. 5.

MERLIN. See Arthur, Vol. II, p. 568.

MEROBAUDES, Flavius. See Rutilius, Vol. XXI, p. 122.

MEROM, a village of Sullivan County, southwestern Indiana, picturesquely situated on bluffs, on the Wabash River, two hundred feet high. It has a station on the Indiana and Illinois Southern railroad. It is the seat of Union Christian College, founded in 1859, which in 1901 had 15 instructors, 238 students, and a library of 3,680 volumes. Population 1890, 412; 1900, 478.

MEROPEDÆ. See Bee-Eater, in these Supplements.

MEROSTOMATA. See Crustacea, Vol. VI, pp. 585–586.

MEROVINGIAN. See France, Vol. IX, 467.

MERRIAM, Augustus Chapman, educator; born in Locust Grove, N. Y., May 30, 1843; was graduated at Columbia College in 1866, and became instructor of Latin and Greek there two years later. In 1880 he was appointed adjunct professor of the Greek language and literature, and in 1890 the chair of epigraphy and Greek archæology was created for him. He became the greatest

American authority in this field. He conducted a number of notable excavations in Greece, and persuaded Professor Halbherr to undertake explorations in Crete, which resulted in important discoveries. Professor Merriam edited *Phæacian Episode of the Odyssey*, etc. He died in Athens, Greece, Jan. 19, 1895. G.J.H.

MERRIAM, Clinton Hart, an American biologist; born in New York city, December 5, 1855. He was graduated from Yale in 1877, and from the College of Physicians and Surgeons in New York in 1879. From 1878 to 1885 he was engaged in the practice of medicine. In 1891 he was United States Behring Sea commissioner and visited Alaska in the interest of fur seal investigations. He published *Birds of Connecticut* (1877); *Life Zones and Crop Zones of the United States* (1891); *Biological Reconnaissance of Idaho* (1891); *Geographical Distribution of Life in North America* (1892); *Flora and Fauna of the Death Valley Expedition* (1893), and *Temperature Control of Distribution of Animals and Plants* (1894). W.M.C.

MERRIAM, Hon. Wm. Rush, director of the Twelfth United States Census (1900); was born in Essex Co., N. Y., July, 1849, and educated at Racine College, Wisconsin. Early in the sixties his family moved to St. Paul, Minn., where he entered a bank and became first cashier and afterwards president of the institution. He also engaged in politics and became a member and later on speaker of the Minnesota Legislature, and from 1889 to 1892 was Republican governor of the state.

MERRILL, a city and the capital of Lincoln County, northern-central Wisconsin, on the Wisconsin River, 17 miles above Wausau, and on the Chicago, Milwaukee and St. Paul railroad. There is a lumber-boom here with a capacity of 100,000,000 feet of logs. Lumber, lath and shingles are shipped in large quantities. It has good schools, a public library, and two national banks. Population, 1890, 6,809; 1900, 8,537.

MERRILL, George Perkins, geologist; born in Auburn, Me., May 31, 1854; was graduated at the Maine State University in 1879; and was assistant chemist at Wesleyan University in 1879–80. He was appointed assistant in the geological department of the United States National Museum in 1881; and became head of that department in 1897. In 1893 he accepted the chair of geology and mineralogy at Columbian University. He has published many technical works. G.J.H.

MERRILL, Selah, an American clergyman; born in Canton Center, Conn., May 2, 1837. He was educated at Yale and at the New Haven Theological Seminary, and in 1864 became chaplain in the Federal Army. In 1882 he was appointed U.S. Consul at Jerusalem. He has written *Galilee in the Time of Christ* (1881); *The Site of Calvary* (1885), and other works. W.M.C.

MERRIMAC, a town of Essex County, Massachusetts, in the northeastern corner of the state. It lies in a manufacturing region, thirty miles north of Boston, and comprises within its limits several manufacturing villages. It is traversed by the Boston and Maine railroad, and had in 1900 a population of 2,131. W.F.J.

"MERRIMAC," The, a steam collier of about 5,000 tons, purchased by the United States during the war with Spain. While with the fleet off Santiago she was purposely sunk in the entrance to the harbor, in order to prevent the escape of Cervera's ships,—a scheme which failed in its intended effect owing to injuries received from the Spanish fire. The plan originated with Admiral Sampson, and after discussion the details were largely planned and were carried out as far as possible by Lieutenant-Commander Richmond Pearson Hobson and his seven volunteers, who, captured by Admiral Cervera himself and imprisoned for a time, were subsequently exchanged. See United States, in these Supplements, XXIX, p. 389.

MERRIMAC RIVER, the principal stream in the state of New Hampshire, is formed by the union of the Contoocook and Pemigewasset rivers, at Penacook, in Merrimac County, in the south-central part of the state, and flows southward to the Massachusetts line, whence it turns to the east and north and reaches the Atlantic Ocean at Newburyport. W.F.J.

MERRIMAN, Henry Seton. See Scott, H. S., in these Supplements.

MERRIMAN, Mansfield, an American civil engineer and author; born in Southington, Conn., March 27, 1848. He graduated from the Sheffield Scientific School at Yale in 1871. In the two years following he was assistant engineer in the United States Corps of Engineers. In 1875 he was appointed instructor in civil engineering at Yale, and in 1878 became professor at Lehigh University. He has written *Theory of Continuous Bridges* (1876); *The Figure of the Earth* (1881); *Mechanics and Materials* (1885); *Treatise on Hydraulics* (1889), and other works. W.M.C.

MERRITT, Wesley, military officer; born in New York city, June 16, 1836; was graduated at the United States Military Academy in 1860; entered the army as a brevet 2d lieutenant of cavalry, July 1; was commissioned a brigadier-general, April 16, 1887; and major-general, April 25, 1895; and was retired, June 16, 1900. Besides other brevets he received those of major-general of volunteers, Oct. 19, 1864, and major-general, U.S.A., March 13, 1865. At the outbreak of the Civil War he was attached to the Army of the Potomac, serving in the Virginia peninsular campaign. He was then transferred to the defences of the national capital; took part in all the battles of the Army of the Potomac, and won great distinction at Gettysburg, Yellow Tavern, Five Forks, etc. He was with General Sheridan in his cavalry raid toward Charlottesville, and from August, 1864, to March, 1865, he had command of a cavalry division in the Shenandoah

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campaign. He then led a cavalry corps in the Appomattox campaign, and was one of the officers selected to arrange for the surrender of the Army of Northern Virginia. After the war he took part in a number of Indian campaigns. In 1882–87 he was superintendent of the Military Academy; and in 1887–98 commanded the Department of the Atlantic. From May till December of the latter year he had command of the first American troops sent to the Philippines. He was then ordered to Paris to assist the American Peace Commission. On his return to the United States he commanded the Department of the East till his retirement. G.J.H.

MERSEY, a river of England, formed in Derbyshire by the union of the Goyt and the Etherow. It flows west, expanding below Runcorn into the broad estuary on which Liverpool is situated. This estuary is about sixteen miles long, and it empties into the Irish Sea. Between Tranmere and Eastham on the Cheshire side, and Dingle Point and Garston on the Lancashire shore, is a fine anchorage called the Sloyne. A tunnel under the river, opened in 1886, connects Liverpool with Birkenhead. In 1895 the mouth of the river was dredged, and vessels drawing 23 feet can enter at low tide. See CANAL, and MANCHESTER, in these Supplements.

MERSINA, port of Tarsus. See CILICIA, Vol. V, p. 679.

MERSON, LUC OLIVIER, a French painter; born in Paris, May 21, 1846; a pupil of Pils and the National School of Fine Arts, where he was awarded the grand prix de Rome in 1869; he devoted himself to historical and religious painting; was awarded a first medal at the Salon of 1875, a gold medal at the Paris Exposition of 1889, and was made a member of the Institute in 1892. Among his noted canvases are *Apollon Exterminateur* (1869); *St. Edmund of England, King-Martyr* (1872); *Le Sacrifice à la Patrie, St. Michel*, model for a Gobelins tapestry (1875); *St. François d'Assise Prêche aux Poissons* (1881); *Le Jugement de Pâris; L'Arrivée à Bethléem* (1885); *L'Annonciation* (1892). His drawings have been much admired; nine of them appeared in *Harper's Magazine* in 1892.

MESABI RANGE. See IRON AND STEEL, in these Supplements.

MESCAL, an intoxicating liquor, with some remarkable effects, obtained from a small species of spineless cactus (*Lophophora Williamsii*) growing along the Mexican border of Texas and in adjacent Mexico. The plant has the form of a small turnip. The top, being cut off and dried, shrivels into a button-shaped mass, and is known and sold as a "mescal button." These mescal buttons are used extensively in the religious ceremonies of the natives, who chew them and thus bring about certain curious psychological effects. In consequence of this use, the mescal-plant is regarded as sacred by the natives.

MESENTERY. See DIGESTIVE ORGANS, Vol. VII, p. 196.

MESHA, KING. See MOAB, Vol. XVI, p. 558.

MESMER, FRIEDRICH ANTON. See MAGNETISM, ANIMAL, Vol. XV, p. 280.

MESOZOIC PERIOD. See GEOLOGY, X, 312–319.

MESQUIT GRASS, a name often given to certain species of *Bouteloua*, valuable pasture grasses of the Southwest. The other species of the genus are often called grama grasses.

MESQUIT TREE, the *Prosopis juliflora*, a spiny shrub or tree of Texas, belonging to the *Leguminosæ*. It is the chief woody plant of the wooded table-lands and high valleys, often forming impenetrable thickets. It is useful for fuel, for a gum, and as an article of food, the ripe bean, called screw-bean, being one of the staple foods of Mexicans, Indians and grazing animals.

MESSALINA. See CLAUDIUS, Vol. V, p. 713.

MESSAPIAN LANGUAGE. See LATIN LANGUAGE, Vol. XIV, p. 327.

MESSINA, STRAIT OF. See SICILY, Vol. XXII, p. 34; MEDITERRANEAN, Vol. XV, p. 829.

MESTIZO OR MESTINO, the offspring of a Spaniard or creole and a native Indian, found in all Spanish-American countries, especially Mexico. The color is very little darker than that of a white person and the skin is very transparent, the chief indications of Indian blood being a thin beard, slanting eyes, and small hands and feet. R.W.C.

META. See ORINOCO, Vol. XVII, p. 868.

METABOLISM, in botany, refers to all chemical changes which occur in a living plant. These changes are either those by which more complex substances are made from simpler ones,—a process known as *constructive metabolism* or *anabolism;* or those by which simpler substances are derived from more complex ones,—a process known as *destructive metabolism* or *catabolism.* The most characteristic anabolic process in plants, as distinguished from animals, is that by which green tissue is able, under the influence of light, to construct organic substance from absorbed carbon-dioxide and water (see, under PHOTOSYNTAX, in these Supplements). The constructive or anabolic process reaches its highest expression in the living substance *protoplasm.* Catabolism or destructive metabolism includes the breaking down of protoplasm itself and of other complex substances. This breaking down is usually associated with the absorption of oxygen and the evolution of carbon-dioxide. These processes affect, also, the state of energy in the plant, anabolism being accompanied by the conversion of kinetic into potential energy, and catabolism by the conversion of potential into kinetic energy. See also PHYSIOLOGY, Vol. XIX, pp. 56–62; and ANABOLISM, in these Supplements.

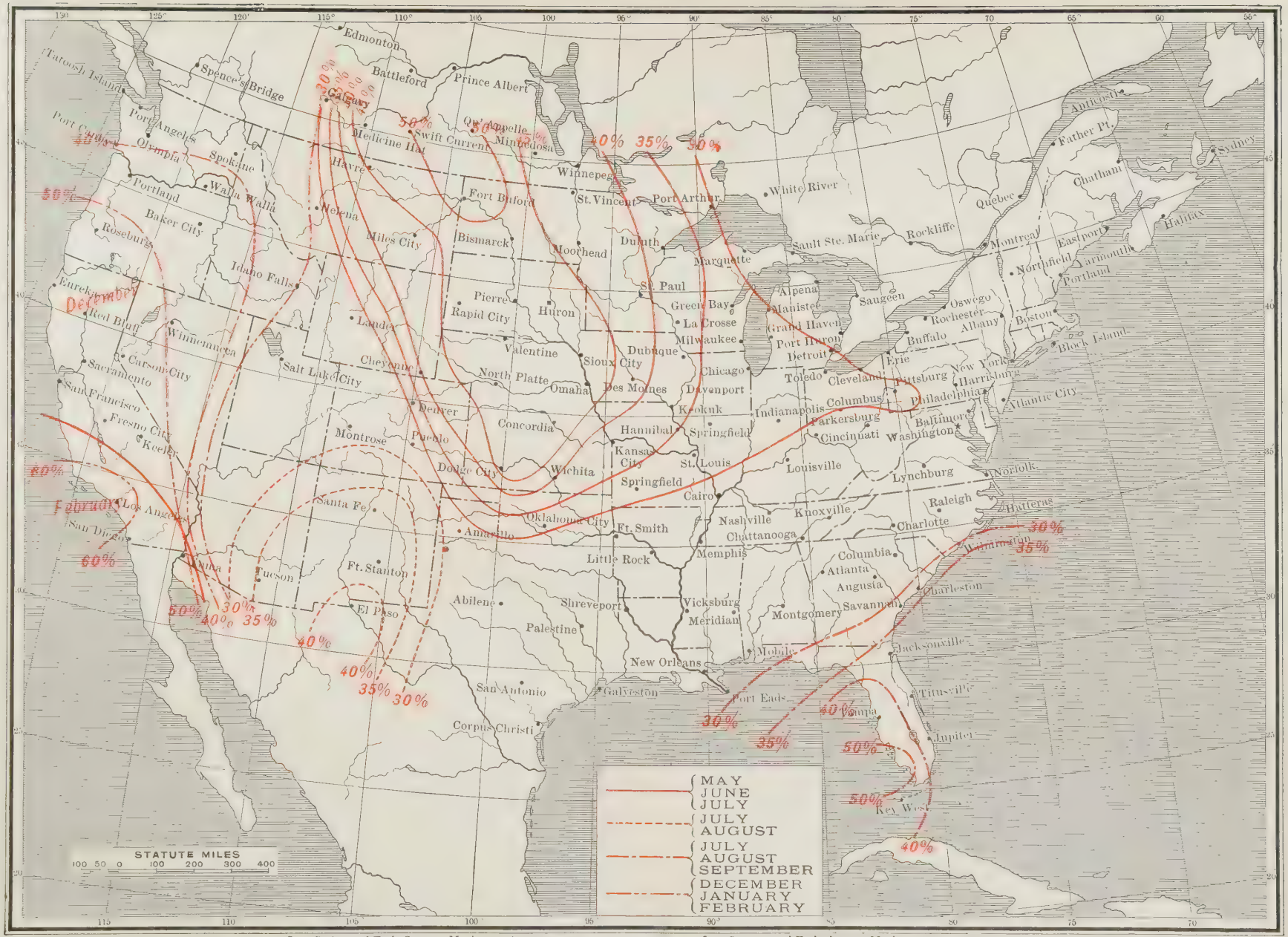
METABOLISM, in animals. See NUTRITION.

METAGONY. See HEREDITY, XXVII, p. 275.

METAMERISM. In zoölogy, see MOLLUSCA, Vol. XVI, p. 698. In chemistry, see CHEMISTRY, Vol. V, p. 477.

METAMORPHIC ROCKS. GEOLOGY, X, 278–80.

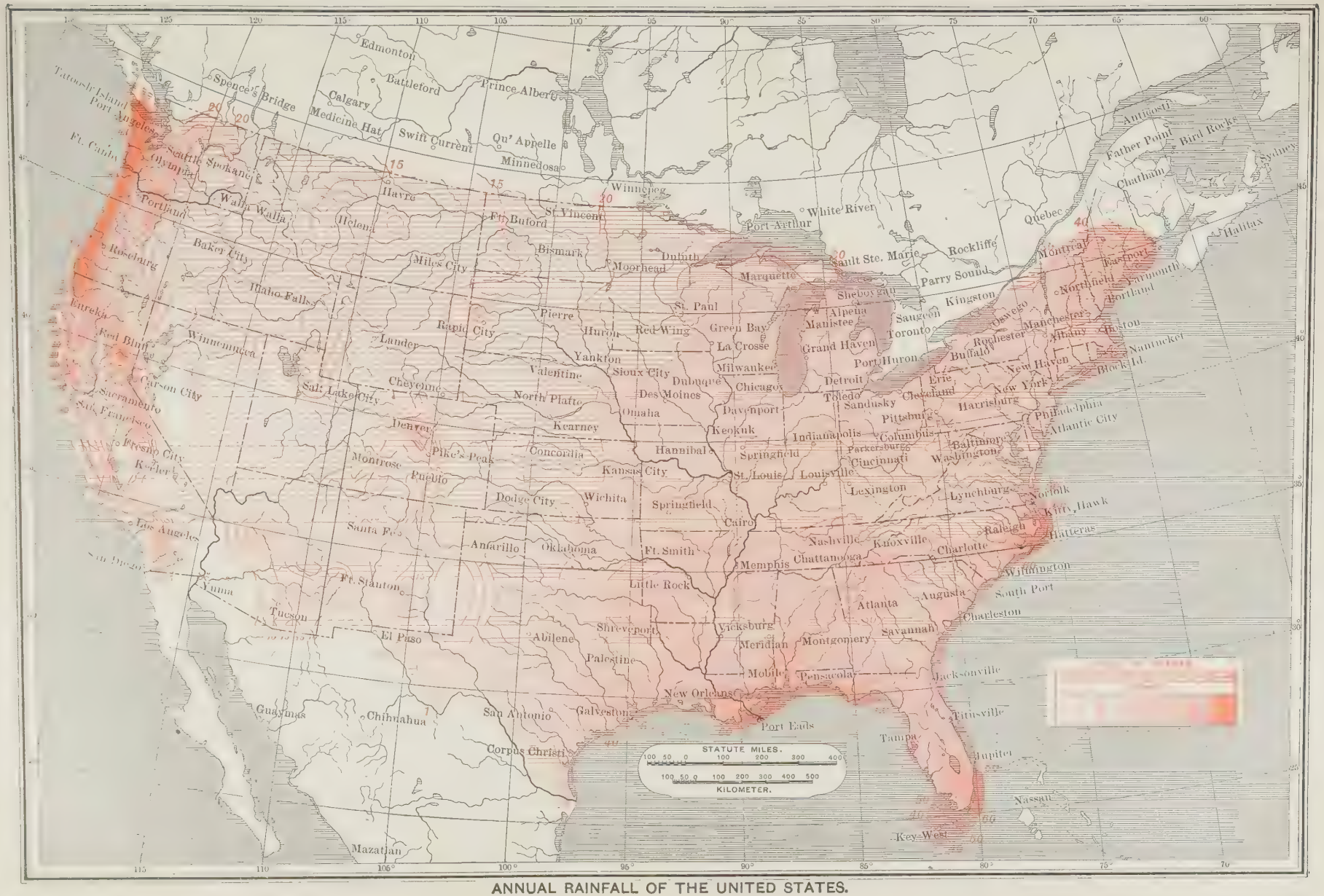
METAMORPHOSCOPE, a toy mechanism for combining portions of figures in a grotesque fashion. It consists of three or more bands upon which figures, as of persons or animals, are pictured in such manner that the heads are on the



Late Spring and Early Summer Maximum ——————
Late Summer Maximum — — — — — — — —
Late Summer and Early Autumn Maximum —— — ——
Winter Maximum —— — — — —

Percentages mean the percentage of total annual rainfall occurring in the seasons as defined.

RAINY SEASONS OF THE UNITED STATES.



ANNUAL RAINFALL OF THE UNITED STATES.

upper band, the bodies on the next band, and the legs and feet on the lower bands. By shifting the bands so that the wrong bodies, legs, etc., are connected with the heads, the figures are metamorphosed with more or less amusing effects.

METAPHOR. See RHETORIC, Vol. XX, p. 527.

METATHERIA. See MAMMALIA, XV, p. 374.

METAYAGE, land tenure system. See AGRICULTURE, Vol. I, pp. 368–369.

METAZOA. See ANIMAL KINGDOM, II, 46–49.

METCALF, VICTOR HOWARD, an American executive officer; born in Utica, N. Y., Oct. 10, 1853; was graduated at the Yale Law School in 1876 and admitted to practice in the supreme court of Connecticut in 1876 and in that of New York in 1877; removed to Oakland, Cal., in 1878; was elected to Congress as a Republican in 1898 and re-elected in 1900 and 1902; and was appointed secretary of the Department of Commerce and Labor in June, 1904. G. J. H.

METEOROGRAPH, an instrument for making records of meteorological phenomena. It has a recording cylinder bearing a roll of paper and a clockwork mechanism which gives a quarter-hour record of the condition of the thermometer, barometer, direction and mean force of the wind, degree of humidity and atmospheric pressure.

METEOROLOGY. To the excellent article by Dr. A. Buchan on METEOROLOGY, in this work (see Vol. XVI, pp. 119–164), there may properly be added two matters of especial interest to Americans; viz., an account of the United States Weather Bureau and a discussion of the rainfall of the United States.

1. The American Weather Bureau is the most notable in the world in the extent of area which it endeavors to cover, in the magnitude of its annual expenditures and in the accuracy and amount of detail of the work which it accomplishes. The interest in general meteorological problems in the United States began early. Franklin was apparently the first to call attention to the important fact that the northeasterly storms of the Northern states came from the west. This was the first intimation, at least in this country, that storm areas drifted eastward,—a fact of so fundamental importance that the possibility of a system of weather-forecasting depends on it. Not long after (1772–77), Thomas Jefferson undertook simultaneous meteorological observations in conjunction with Bishop Madison, cousin of President Madison. The stations employed were Monticello and Williamsburg, both in Virginia, and about 120 miles apart. It is the use of simultaneous observations that makes the weather-map possible, and thus we have the second fundamental requirement of a weather service. The third is the speedy collection of observations, and this was afforded by the telegraph invented by Morse in 1837.

With the extension of telegraph lines over the United States came at once the idea of a weather service. Commodore Maury proposed the collection and charting of the observations in the early fifties, and traveled over the United States canvassing the idea. About the same time Professor Henry, the first secretary of the Smithsonian Institution, put the idea in operation by means of a map with movable symbols. Such a map was put up in the halls of Congress and attracted much interest and attention, but the work was discontinued in 1861, at the beginning of the late Civil War.

In 1869 the idea was revived and put into practical operation by Professor Cleveland Abbe, then director of the Cincinnati Observatory, and successor of the late Gen. O. M. Mitchell. The data were collected by the Western Union Telegraph Company, free of charge, and the enterprise was fostered by the Cincinnati Board of Trade. Professor Abbe drew the maps, and copies of them were struck off in the local office of the telegraph company, and the work was continued for several months.

Great interest was taken in this enterprise by boards of trade and by scientific men, and in the session of Congress following, Hon. H. E. Paine, at the urgent request of Prof. I. A. Lapham of Milwaukee, introduced a joint resolution, which was passed by Congress, requiring the Secretary of War to have meteorological observations taken and storm-warnings issued for the Great Lakes and the Atlantic seaboard. This duty was placed by the Secretary of War in the energetic hands of General Myer, then chief signal-officer. The first weather-bulletin was issued Nov. 1, 1870, the first storm-warning a week later, and the first weather-map on Jan. 1, 1871. This was not the first governmental weather service, as Admiral Fitzroy inaugurated, in 1861, the British system of weather charts and forecasts, and on Sept. 16, 1863, Leverrier, at Paris, began the series of French weather-maps, the publication of which has been continued since without interruption. The American governmental service is, of the score or so now existing, third in order of commencement, but if we take into consideration Maury's proposal and Henry's maps, it may fairly be claimed that the credit of beginning this noteworthy movement and of proving its practicability belongs with the United States.

Gen. A. J. Myer remained in charge of the weather service until his death on Aug. 24, 1880. His administration was characterized by energy and success, and the forecasts made under his direction had a high degree of popular approval. It was to him that was given the title of "Old Probs," because, with the caution necessary at the beginning of such an enterprise, the early forecasts were issued as probabilities.

Gen. W. B. Hazen succeeded General Myer, and continued in charge until his death, Jan. 16, 1887. His administration was characterized by interest in the growth and development of the science of meteorology. He was succeeded by Gen. (then Captain) A. W. Greely, who remained in charge until July 1, 1891, when the meteorological duties of the Signal Service were handed over to the Weather Bureau, a new bureau created by Congress for the purpose, and placed

under the control of the Secretary of Agriculture. The first chief of the new bureau was Mark W. Harrington, previously director of the astronomical observatory at Ann Arbor, and founder and editor of the *American Meteorological Journal.* On July 1, 1895, he was succeeded by Willis L. Moore, an evolution of the bureau itself, as he had passed through all its grades.

The duties of the meteorological service had gradually been extended until at the time of the transfer it was put in charge of storm, weather and flood warnings, for the benefit of agriculture and navigation, the collection and transmission of climatic and weather information and the compilation and publication of climatic data. The resolution which established it, in 1870, carried an appropriation of $15,000. The next year the appropriation was $102,450, and from year to year it gradually increased, until under General Hazen the annual expenditure was about a million dollars. Under his successor it was decreased to an annual average of $900,000, and under the Weather Bureau to about $850,000. Meantime, the extent of its operations had gradually been increased until, in 1895, there were about 125 telegraphic reporting-stations, 30 exchange-stations with other countries, 2,500 voluntary observers reporting to 42 (1893) state weather services, and upward of 200 river and flood reporting stations. There were also about 160 stations showing storm-signals, between 1,600 and 1,700 showing weather and temperature signals, and about 500 for frosts. Nearly 100 stations make forecasts, and the most of them issue weather-maps. The publications of the bureau are numerous and of varied character. Of weather-maps alone about 2,500,000 are issued annually.

The chief work of the bureau lies in the collection of observations, the making of the forecasts, their distribution, and the preparation and distribution of climatic data. The observations are of several kinds, but the most important are those taken simultaneously twice a day for use in the preparation of the weather-map and its resulting forecasts. The hours used are eight a.m. and eight p.m., 75th meridian time, or five o'clock, Pacific time. At that hour, at each of the telegraphic stations, the observer takes the series of observations required of him, and, in fixed order, reduces them to a cipher used by the bureau, and hands them in at the nearest telegraph station, whence they go, in their proper order, to the central station at Washington City. Here they are taken in charge by the forecast official of the day, who, with the assistance of a force of clerks, uses them for the preparation of the weather-map. The forecasts then are deduced and dictated to a clerk, and the map and forecasts sent at once to the printing-office, where they are struck off with all practicable speed. Meantime, the forecasts are handed over to the great news-gathering agencies, by which they are distributed to the daily newspapers throughout the country. A similar process takes place simulaneously, but on a smaller scale, at all the principal stations outside of Washington; and, within three or four hours after the observations have been taken, the forecasts have been made, and these, with the printed weather-maps, have been scattered broadcast over the country.

The forecasts are made, in each case, for the following day. Those from the morning observations are printed in the evening papers, and are for the next day; those from the evening observations are printed in the morning papers, and are for the day on which the paper appears. The advantage lies with the latter, and they should be more accurate than the former. It is sometimes practicable to forecast for a longer time ahead, especially in the South; but this is not encouraged, for the risk of failure increases very rapidly when the forecast is for more than twenty-four or thirty-six hours. The forecasts depend on the general shift easterly of the weather existing at any moment over the United States. This shift is at about the speed of an express train, but is subject to innumerable fluctuations in speed and direction, and the weather conditions, in advancing, may change in intensity or assume new features. The skill of the forecaster lies in foreseeing these fluctuations, and, for this, long experience, as well as a sort of intuitive tact, is necessary. The cyclones advance more uniformly than do anticyclones; and the former, when coming in view west of meridian 90°, usually direct their course toward the Great Lakes, while the latter are more likely to move toward the middle Atlantic coast. Great learning in meteorology does not necessarily enable a man to make high-class forecasts, and of late years as good records have been made by novices as by men of fifteen or twenty years' experience. A fair estimate of the verification of forecasts is probably 90 per cent, or nine successful forecasts out of ten; but the official verifications do not give so high a percentage — due to the inflexible arithmetical rules which the verifier must follow. So imperfectly do these rules fit the case, that ambitious forecasters sometimes are accused of predicting for record rather than for the public. Successful prediction is most difficult along the northern boundary of the States, due both to the higher degree of variability of the weather there and to the fact that most storms enter along this boundary. It is easiest on the southern boundary, because the weather there is most settled. Moreover, the storms which enter on the southern boundary are relatively rare, and are often intense. The more intense the storm, the easier it is to foresee its progress.

The distribution of forecasts, when made, presents many difficulties. That large part of the population which reads the daily papers soon after issue is informed from day to day as to approaching weather, and the additional fraction of the population which is within sight of the weather-signals, and understands them, can also be reached. But there is another large part of the population—those at sea and those in rural dis-

tricts—who cannot yet be reached except imperfectly and spasmodically. When a destructive change of weather is imminent, especial pains are taken to telegraph, and otherwise distribute by means of all available channels, warnings of danger, and at such times public interest is aroused and aids the distribution. Ordinarily, the farmer and ranchman cannot be reached, and there seems to be no prospect that he will be reached regularly until the telephone system is extended throughout the country.

Though the forecasts still are lacking in precision and detail, and their distribution is still imperfect, yet, in the service they render, they are worth probably ten or twenty times as much as they cost. Improvement must now come chiefly in increased accuracy in the forecasts themselves, and in more of detail in their statement. The art so far has depended chiefly on empirical methods, and advance in this direction seems to be about exhausted. Further progress can hardly be expected, except by improvements in the theory of meteorology. The science is one of those general terrestrial ones, like geography or geology, which cover so broad a field that governmental aid is needed for their growth. This is especially true of meteorology, when government already has occupied so completely the field that private enterprise languishes. There are two directions of advance which give especial promise of useful results. The first lies in the study of the phenomena of the condensation of moisture in the air into raindrops and other forms. The best judges are of the opinion that in this process lie the secrets of such intense storms as tornadoes. The investigation of this process was begun some years ago by the Weather Bureau, but a change of administration promptly put an end to it. The other promising line of research lies in the investigation of the meteorological processes taking place in the free air, especially in the cloud-layer. An investigation of the free air can be carried on by balloons, towers and kites, and the latter in 1896 had developed unexpected capacity for usefulness.

2. *Rainfall.* The work of the Weather Bureau in the compilation of climatic data is illustrated by the rainfall-maps issued in 1894, the result of a study of all the available observations made in the United States. The results are of great interest, and two of the maps of most importance are given herewith.

The mean annual rainfall over the United States (except Alaska) is given on the first chart. This map shows many details, which each reader may be left to find for himself. It will suffice here to point out that the heaviest rainfall in the United States is in the extreme Northwest and Southeast, and also at the southern extremity of the Appalachian range of mountains and about Cape Hatteras. The area of lightest rainfall is defined by an isohyetal of five inches, and is in the Southwest. This arid region is the extension of a Mexican one, and changes its extent and form greatly from month to month. The greatest mean annual rainfall known in the United States is over 100 inches. The least is less than five.

The quantity of rainfall is not the only element that decides the agricultural possibility of an area. The time and character of fall are also of importance. If the rain descends in torrents or cloudbursts, it flows off with little penetration of the soil, and, moreover, by carrying the soil with it, is likely to cause injurious washes. Where it falls gently, its penetrating power is greater, the run-off is relatively less, and its action on animal and plant life more favorable. The gentlest rainfalls in the United States are found in the Northeast (especially about the eastern end of Lake Ontario) and in the Northwest, west of the Cascade Range of mountains.

Of still more importance is the season at which the most rain falls, for a light rainfall may be sufficient if it comes at the period of growing crops, and a heavy rainfall insufficient if at other seasons, and injurious if at the time of harvest. The second chart gives the areas where there is a marked fluctuation of rain with the season at which the maximum occurs. It appears from this that there are four distinct areas in the United States with marked rainy seasons. These are, the northern plains, with a late spring and early summer rainfall; Arizona and New Mexico, with a late summer rainfall; Florida, with a late summer and early autumn rainfall; and the Pacific Coast, with a winter rainfall, extending into the spring in the North.

MARK W. HARRINGTON.

METERS, measures of quantity or force. See GAS-LIGHTING, Vol. X, pp. 87, 88; and HYDROMECHANICS, Vol. XII, pp. 534–536.

METHODIST CHURCHES IN THE UNITED STATES. For a general account of Methodism, see Vol. XVI, p. 200.

THE METHODIST EPISCOPAL CHURCH is the oldest and largest Methodist church in the United States. From 1766, when the first society was formed in New York City, to 1773, when the first conference was held in Philadelphia, the churches were scattered organizations in New York, Pennsylvania, Virginia and other states; and the preachers were itinerants, nearly all of English descent. In July, 1773, ten preachers, representing 1,160 members, met in conference in Philadelphia. The Revolutionary War interfered greatly with the peace and development of the church. Dec. 24, 1784, sixty itinerant preachers met in conference and formed themselves into an independent organization, which they called the Methodist Episcopal Church. The conference adopted a Sunday service, articles of faith and an episcopal form of government. The second conference thus organized was held in 1792, in which the discipline was revised, regular conferences ordered, to meet every four years, and provision made for the election of bishops and the appointment of presiding elders.

In the conferences which followed, the structure of the church was gradually modified to meet

changed conditions, but its characteristic features were quite well defined before the beginning of the nineteenth century. The territory of the United States has been divided into annual conferences, and benevolent societies, educational institutions, Sunday schools, and a publishing-house have been established. The official records furnish instructive facts concerning the growth of this church for the past one hundred years. In 1901, the two chief branches, north and south, of the body had 40,265 churches, 23,563 ministers, and 4,174,301 communicants. In 1896 there were 30,264 Sunday schools, having 344,844 officers and teachers, and 2,580,973 scholars; 25,384 church edifices, valued at $107,972,088, and 9,813 parsonages, valued at $16,649,392. For benevolent society purposes there was contributed, in 1895, $2,105,020; for ministerial support, $10,385,948; for buildings and improvements, $4,379,307; and for current expenses, $3,680,698. (Compare the amount expended for ministerial support in 1895, with the official record that in 1800 the General Conference increased the salary of preachers to $80.) The number of theological institutions, colleges and universities, classical seminaries, foreign mission schools, Bible training-schools, etc., in 1895, controlled wholly or in part by this church, was 219, the value of whose grounds and buildings was $14,644,525, the number of professors and teachers 2,792, and the number of students 43,320.

The highest authority in the Methodist Episcopal Church is the legislative body known as the *General Conference*, its members being ministerial and lay delegates from the annual conferences. It is presided over by the bishops, acts as a court of final appeal, elects bishops, editors of church periodicals, book agents, and other officers connected with missionary and educational work. The *Judicial Conference* tries bishops and hears appeals of members convicted in an annual conference. *Annual Conferences* are administrative in their functions, and may be presided over by a bishop. *District Conferences* have the care of the benevolent, educational and financial interests of their respective districts. Their membership consists of a presiding elder, pastors, and one steward and Sunday school superintendent from each charge in the district.

The highest officers of the church are the bishops, who, collectively, are called the Episcopal Board. Since its organization the church has had 46 bishops; the board in 1896 numbered 18. The bishops not only preside over annual and general conferences, but they also divide the territory into districts, station the pastors, ordain deacons, elders and newly elected bishops. They have the general supervision of the affairs of the church, both temporal and spiritual. The function of a bishop is not restricted to the district to which he is assigned by the General Conference, but he has joint jurisdiction over the entire church. They hold office for life. Next to the bishops are the presiding elders, who preside over the Quarterly Conference, which consists of the pastors, preachers, stewards, class-leaders, trustees and Sunday school superintendents of a single charge. The sessions of this conference are called Quarterly Meetings. By their council the presiding elders aid the bishops in the stationing of pastors. Their term of office is six years. Candidates for the ministry, upon examination and two years' trial as a preacher, may be admitted to the General Conference and ordained deacon, and two years after, elder. Deacons, elders and preachers usually perform the same duties—they are the pastors. Class leaders preside over "classes" in the church, which meet weekly. Admission to the church is granted, as a rule, after six months' probation. Pastors were, in 1804, obliged to change their charges every two years, but the time was extended in 1888 to five years, except in certain cases.

An inspection of the records of the General Conferences from 1784 to 1896 shows that, from time to time, various questions relating to the organization, discipline and wellbeing of the church have arisen in the conferences, an account of the more important of which is here briefly given. A notable one, not yet settled, is the question of membership in the General Conference. In 1800 membership was restricted to preachers who had traveled four years. In 1808 provision was made for *Delegated General Conferences*—delegates to be not more than one for every five members of an annual conference. In 1824, and again in 1840 and 1856, it was decided that a lay delegation was inexpedient, but in 1860 it was ordered that the question be submitted to the annual conferences and the male membership of over 21 years of age. The conferences and membership having approved of lay delegates, they were for the first time admitted in 1872. The eligibility of women to a seat in the General Conference was discussed in 1888 and decided adversely, on constitutional grounds; the same decision was reached by the conference of 1892, when it was voted that the term *laymen* includes men only; but it was ordered to submit the question to a vote of the annual conferences. In 1896 the proposal failed by only 66 votes to secure the requisite three-fourths majority, out of a total of 10,159 votes. The sentiment in favor of admitting women is growing, and the question will again come up in the conference of 1900.

On the question of slavery the church took action at the beginning, declaring it to be contrary to the law of God and the principles of the Declaration of Independence. Although the question had been more or less agitated after that time, the conference of 1836 began in earnest to consider the matter; two members were censured by a vote of 120 to 14 for lecturing at an abolition meeting in Cincinnati during the session of the conference. In the conference of 1844 many days were spent in a slavery debate. A member was suspended for holding slaves, and Bishop Andrew was requested to cease exercising the functions of his office for the same cause. A number of Southern conferences remonstrating, a committee was appointed to prepare a plan of division of the church. In 1845 the Methodist Episcopal Church South was organized and the property of the church divided.

The Methodist preachers of the United States felt from the very first the great need of Methodist lit-

rature for the education and help of the members. Accordingly, what is known as the *Book Concern of the Church* was established in Philadelphia in 1789 on a borrowed capital of $600. From this small beginning the concern has reached gigantic proportions. Its eastern headquarters are now in New York City and the western in Cincinnati (established in 1820), with depositories in the larger cities from Maine to California. In the official report of 1896 it is stated that the combined capital of the two houses is $3,396,952; total sales for the year, $1,857,322; and total profits, $194,472. It is estimated that the two houses have published books, etc., to the value of more than $60,000,000, with $6,000,000 clear profits. Since the division of the church in 1844 the sales of both houses have been $52,729,283. The supervision of the publishing interests of the church is committed to a *book committee* appointed by the General Conference. In addition to books, the church also issues, under the supervision of the General Conference, monthly magazines, weekly papers, some in German and Swedish, Sunday-school journals, tracts, etc., the circulation of which varies from 4,000 to 715,000.

Of benevolent societies instituted by the church may be named, first, the *Missionary Society*, organized in 1819. This society is managed by a board, consisting of the bishops *ex officio*, thirty-two ministers and thirty-two laymen elected by the General Conference. The fields to be occupied, persons employed and the appropriations for the support of each are determined by a General Missionary Committee selected by the General Conference. The receipts of this society for the year 1894–95 was $1,072,990, and disbursements $1,237,845. The committee called for $1,500,000 for missions in 1896.

The second oldest official benevolence of the church is *The Sunday School Union*, established in 1840. Its managers are 32 ministers and 32 laymen, appointed by the General Conference. By last report, 9,355 churches contributed, during the year, $22,542; schools aided, 4,054; copies of English periodicals circulated, 36,682,840; German, 2,168,860.

The Tract Society was organized in 1852. Since 1854 it has operated, also, in foreign countries, and every mission of the church has been helped to publish religious literature in its own spoken language. By last report $20,554 was received during the year, and $19,022 disbursed.

Another important society under the management of the General Conference is the *Board of Church Extension*. Its resources are derived from collections and personal gifts, and from a loan fund, derived from special gifts, available only for loans. Its affairs are under the supervision of three associate bodies. In the thirty years ending 1895, this board had received and disbursed about $5,500,000. The amount authorized in aid in building houses of worship for the year 1896 was $315,250.

The Freedmen's Aid and Southern Education Society, organized in 1866, had expended, at the close of 1895, over $4,000,000 in establishing and supporting institutions of Christian learning in the South. The total receipts for the year ending June 30, 1895, was $367,809; total expenditures, $358,500.

The *Board of Education* is the central agency for the promotion of higher education in the church.

The *American Bible Society* has for its field of operation the whole world. The Bible is sent to all nations. The amount expended in the foreign field in 1895 was $184,538. This society has issued in the past 79 years 59,955,558 copies of the Bible.

The *Woman's Foreign Missionary Society* was organized in 1869 to save heathen womanhood. Its representatives are in Japan, India, South America and other foreign countries. Its 152 missionaries have established day and boarding schools, hospitals, etc. Sixty thousand patients receive medical attention annually.

The *Woman's Home Missionary Society* is doing similar work in the United States. The receipts for the year ending July, 1895, were $236,457.

The *Epworth League* is an organization managed by a board of control appointed, in General Conference, by the bishops, ministers and laymen. The object sought is a broader culture among young people, their larger attendance upon the higher institutions of learning, the providing of lectures for instruction on the University Extension plan, etc. The league came into existence in May, 1889, by the consolidation of various societies whose representatives had met in Cleveland, Ohio, for conference, with the idea of this union in view. The growth of this society has been unprecedented. In May, 1895, its total membership was 1,250,000. In June, 1895, the leagues of the Methodist Episcopal Church, the Church South and the Canadian Church met in Chattanooga, Tennessee, in a sort of international conference, to the number of 1,500 persons.

The idea of an *American University*, which should stand at the head of the educational institutions of the church, was entertained as far back as 1850. For forty years thereafter it was the topic of conversation in the General Conferences and among educators and public men. In 1890 the first subscriptions were received and the first installment paid on a site in Washington, District of Columbia. In May, 1891, a certificate of incorporation from the District of Columbia was issued, and the organization of the university effected by the election of 36 trustees, a chancellor, secretary and registrar. The General Conference in 1892 adopted the university and approved its trustees. In 1893 a new and enlarged charter was granted by Congress and signed by the President of the United States. In January, 1895, plans for the location of the site were received, and in March the last payment on the site was made.

The idea of a special training of women for religious work found its realization in the *Missionary and Deaconess Training Schools*, in which are taught Bible and church history, temperance, domestic science, physical culture, the principles of medical science, nursing, hygiene and sanitation. Schools are located in Minneapolis, Kansas City, New York, Chicago, Washington, San Francisco and other cities.

to the number of fourteen, the most prominent of which are the Lucy Webb Hayes Memorial Training School, Washington, District of Columbia, and the Chicago Training School. Protection and counsel to thousands of immigrant young women, who are homeless and strangers in a strange land, are afforded in the *immigrant homes*, under the supervision of the Woman's Home Missionary Society. These homes are in Boston, New York and Philadelphia. For the year ending July 1, 1895, 6,544 lodgings were provided, 23,685 meals furnished, 96 situations secured, 602 letters and postals written, 114 girls sent to friends, etc.

Children's institutions for the training of needy children are established in the principal cities, and their number is steadily increasing.

Hospitals for the care and treatment of the sick have been established by the church in the larger cities, each having a medical staff, trained nurses, etc.

What is called *Deaconess Work* is a voluntary association of women for such work as the church may have for them to do. The General Conference has recognized the work and prescribed rules for its regulation. The deaconesses receive no salary, are costumed, and must live in communities called *homes*. They act as pastors' assistants, visit from house to house, conduct meetings for women and children, visit prisons and police-stations, conduct orphanages, assist in hospitals, nurse among the sick poor, edit papers, etc. The number of these homes in the United States is 18. Another benevolent institution for which the church has a growing regard is *Homes for the Aged*, of which there are six in the United States under the supervision of the church.

The *Itinerant's Club* was organized in 1889 for the purpose of enlarging the world in which the young minister lives, and to aid him in his endeavor to acquire the best and highest general and professional culture. Young ministers who have lacked the training of the seminaries and colleges are especially benefited by this club, which provides courses of lectures in systematic theology, exegesis, Christian sociology and practical theology. Since its organization there has been greater interest in general ministerial education throughout the church and the standards of examination in the annual conferences have been greatly improved.

Other Methodist churches in the United States are as follows:

The Methodist Episcopal Church South. As before mentioned, the Methodist Episcopal Church divided on the question of slavery in 1844. May 1, 1845, the slave holding conferences met in Louisville, Kentucky, and organized the Methodist Episcopal Church South. Before the Civil War it published weekly, monthly and quarterly periodicals, and had 76 academies and colleges. During the war its educational, publishing and missionary interests were nearly destroyed and its membership greatly reduced. By official reports in 1895 this church has 5,868 traveling and 6,724 local preachers; the white members number 1,382,765, and colored and Indian 5,058; Sunday schools 13,873, teachers 99,338, scholars 811,579; church edifices 13,581, value $21,093,918; parsonages 3,282, value $3,780,149; contributions for foreign missions $215,815, domestic missions $130,919, total $347,654; appropriations for presiding elders $281,080, for preachers in charge $2,019,551, for bishops $36,843; chapters of Epworth League 1,950, members 87,750.

African Methodist Church. Total itinerant ministers, local preachers and exhorters, 20,250; total of members, 599,141; church edifices, 4,575; value, $8,650,155; universities, colleges and schools, 41; value, $756,475; expense (1894–95) for preachers, publication, church extension, Sunday schools, missions, etc., $1,370,127; for education, professors and teachers, books, etc., $978,870.

African Methodist Episcopal Zion Church. Traveling and local preachers and exhorters, 2,397; membership, 394,562; Sunday schools, 2,175; officers and teachers, 13,145; scholars, 108,820; church edifices, 1,605; value of church property and parsonages, $3,019,084.

African Union Methodist Protestant Church. Traveling and local preachers, 1,550; total membership, 7,000; Sunday schools, 350; officers and teachers, 900; scholars, 2,770; church edifices, 700; value of church property, $60,000.

Colored Methodist Episcopal Church in America. Traveling and local preachers, 4,083; membership, 170,718; Sunday schools, 4,007; teachers, 7,098; scholars, 79,876; church edifices, 4,004; schools, 6; students, 907; value of school property, $98,000.

Congregational Methodist. Membership, 12,500; ministers, 204; church edifices, 238.

Congregational Methodist (Colored). Ministers, 5; churches, 5; members, 319.

Evangelist Mission. Ministers and local preachers, 114; membership, 4,600; churches, 13; Sunday school scholars, 1,200; value of church property, $25,000.

Free Methodist. Traveling and local preachers, 1,660; members (1894), 26,140; Sunday schools, 942; scholars, 32,552; value of church property, $1,069,074.

Independent Methodist. Ministers, 8; churches, 15; members, 2,569.

Methodist Protestant. Ministers and local preachers, 1,965; membership, 166,032; churches, 2,042; parsonages, 460; value of churches and parsonages, $4,602,243; Sunday schools, 1,844; officers and teachers, 16,235; scholars, 105,314; pastors' salaries, $296,974.

New Congregational Methodist. Churches, 35; membership, 1,200; Sunday schools, 25; value of church property, $5,000.

Primitive Methodist. Traveling and local preachers, 208; members, 6,340; Sunday-schools, 108; scholars, 11,750; churches, 100; parsonages, 41; value of property, $416,143.

Union American Methodist Episcopal. Ministers, 115; churches, 115; communicants, 7,031.

Wesleyan Methodist. Membership, 18,141, Sunday schools, 465; scholars, 18,344; value of church property, including churches, parsonages and publishing house, $580,472.

ZION UNION APOSTOLIC. Ministers, 30; churches, 32; communicants, 2,346.

The latest revised returns for all the religious denominations of the United States for 1895 show a grand total of 125,503 ministers, of which the Methodists had 32,369, or more than 25 per cent; grand total number of churches, 178,754, Methodist 53,537, or nearly 30 per cent; grand total of communicants, 23,614,443, Methodist 5,124,636, or more than 21 per cent. With the exception of the Catholic Church, which had 7,742,774 communicants, the Methodist denominations of the United States outrank any other in number of churches, ministers and communicants. D. O. KELLOGG

METHUEN, a town of Essex County, northeastern Massachusetts, on the Boston and Maine railroad. It manufactures cottons, woolens, hats, and shoes. The Nevins Memorial is here. Pop. 1890, 4,814; 1900, 7,512.

METHUEN, LIEUT.-GENERAL, LORD P. SANFORD, C. M. G., in command of the 1st Division British army corps in the Boer war of 1899–1900; was born Sept. 1, 1845 and entered the army as lieutenant in the Scots Fusilier Guards in 1864. He was sent on special service, with the rank of colonel, to the Gold Coast in 1873, and in the following year became brigade-major at Ashanti. From 1877 to 1881 he was military attaché to the British Embassy at Berlin. He commanded Methuen's Horse and the Field Force during the Bechuanaland Expedition of 1884–85, and was deputy adjutant-general in South Africa in 1888. From 1892 to 1897 he commanded the Home District in England, and at the outbreak of the war with the Dutch republics in South Africa was given high command, arriving at Capetown Nov. 10, 1899. On landing he organized a flying column for the relief of Kimberley, and was in charge of the Western campaign, being present at the battles of Belmont, Enslin, and Magersfontein. Later on he was captured and released by Gen. Delarey.

METHYL ALCOHOL, CARBINOL OR PYROXYLIC SPIRIT. Methyl alcohol is found with acetic acid, acetone and water in the product obtained by distilling wood. Chemically, it is related closely to ordinary alcohol, and has the formula CH^3OH. It is used commercially in making dyes, and for the preparation of varnishes and other industrial purposes.

METRE OR METER AND METRIC SYSTEM. See WEIGHTS AND MEASURES, Vol. XXIV, p. 507.

METRES OR METERS, in verse. See PROSODY.

METROPOLIS CITY, a city and the capital of Massac County, southern Illinois, on the Ohio River, forty miles from its mouth, and on the St. Louis, Alton and Terre Haute railroad. It is built on the site of a fort constructed by the French about 1700. Population 1900, 4,069.

MEXICO, REPUBLIC OF. (For general description, geographical and historical, see Vol. XVI, pp. 214–230.) Mexico has enjoyed peace under the continuous administration of Porfirio Diaz from 1887 until 1902. During this period the country has developed to a very great extent. Colonization has been encouraged; large concessions of land to corporations and private individuals have resulted in the extension of railroads, opening of mines and the establishment of large irrigation plants in districts suited to agriculture; profitable commercial treaties have been negotiated with the United States, Great Britain and Germany.

CONSTITUTION AND EXECUTIVE GOVERNMENT. The Mexican constitution now in force was adopted Feb. 5, 1857, and modified at different dates to May, 1896. Under its terms, Mexico is declared a federative republic, divided into states—19 at the outset, but at present 27 in number, with two territories and the Federal District—each of which has a right to manage its own local affairs; while the whole are bound together in one body politic by fundamental and constitutional laws. The powers of the supreme government are divided into three branches, the legislative, executive, and judicial. The legislative power is vested in a Congress, consisting of a House of Representatives and a Senate; and the executive in a president. Representatives, elected by the suffrage of all respectable male adults, at the rate of one member for 40,000 inhabitants, hold their places for two years. The qualifications requisite are to be 25 years of age and a resident in the state. The senate consists of 56 members, two for each state, of at least 30 years of age, who are returned in the same manner as the deputies. The members of both houses receive salaries of $3,000 a year. The President is elected by electors popularly chosen in a general election, holds office for four years, and, according to an amendment of the constitution in 1887, may be elected for consecutive terms. If the President be unable to fulfill his duties, Congress may elect an acting-president, either temporarily or to the end of the current term. Congress meets annually, from April 1 to May 30, and from September 16 to December 15; and a permanent committee of both houses sits during the recesses.

President of the Republic, 1902, General Porfirio Diaz, installed President of the Republic, as successor of General Manuel Gonzales, May 5, 1877, and has been six times reëlected, entering on his sixth term Dec. 1, 1900. The administration is carried on, under the direction of the President, by a council of seven secretaries of state, heads of the departments of Justice and Public Instruction, Finance, the Interior, War and Navy, Foreign Affairs, Colonization and Industry, and Public Works. The President's salary is $30,000.

Each separate state has its own constitution, government, and laws. Each has its governor and legislature, elected under rules similar to those of the federation. The civil and criminal codes in force in the Federal District prevail in the different states, except Mexico and Vera Cruz.

There are many and serious difficulties in the way of successful colonization, and a large proportion of immigrants in recent years have left the country.

POPULATION AND AREA. The following table gives the areas of the states, territories, and Federal District, and their populations according to the census of Oct. 28, 1900. (For the 1880 census, see Vol. XVI, p. 222.)

Name of State.	Area in Square Miles.	Population, Census, 1900.
Atlantic States.		
Tamaulipas	32,128	218,948
Vera Cruz	29,201	960,570
Tabasco	10,072	158,107
Campeche	18,087	84,281
Yucatan	35,203	312,264
Inland States.		
Chihuahua	87,802	327,004
Coahuila	63,569	280,899
Nuevo Leon	23,592	326,940
Durango	38,009	371,274
Zacatecas	24,757	462,886
San Luis Potosi	25,316	582,486
Aguascalientes	2,950	101,910
Guanajuato	11,370	1,065,317
Querétaro	3,556	228,489
Hidalgo	8,917	603,074
Mexico	9,247	924,457
Federal District	463	540,478
Morelos	2,773	161,697
Tlaxcala	1,595	172,217
Puebla	12,204	1,024,446
Pacific States.		
Lower California (Ter.)	58,328	47,082
Sonora	76,900	220,553
Sinaloa	33,671	296,109
Tepic (Ter.)	11,275	149,677
Jalisco	31,846	1,137,311
Colima	2,272	65,026
Michoacan	22,874	935,849
Guerrero	24,996	474,594
Oaxaca	35,382	947,910
Chiapas	27,222	363,607
Islands	1,420	.....
Grand Total	766,997	13,545,462

Of the total population, 19 per cent were of pure or nearly pure white race, 43 per cent of mixed race, and 38 per cent Indian.

The chief cities, in 1895, estimated their populations thus: Mexico, 329,774; Guadalajara, 83,-934; Puebla, 88,684; San Luis Potosi, 69,050; Guanajuato, 39,404; Leon, 58,426; Monterey, 45,-695; Aguascalientes, 30,872; Merida, 36,935; Oaxaca, 32,437; Morelia, 33,890; Durango, 26,-425; Pachuca, 40,487; Toluca, 23,150; and Vera Cruz, 24,085. In 1895, the foreign population numbered 50,888.

Religion and Instruction. The prevailing religion is the Roman Catholic; but the church is independent of the state, and there is toleration of all other religions. The latest census gives 10,112 Roman Catholic churches and 49 Protestant churches in the Republic. No ecclesiastical body can acquire property. In almost all the states education is free and compulsory. In 1899 there were 11,925 primary schools, with 819,550 pupils. The number attending 227 higher and professional schools is stated at 21,000. The entire amount paid for education is $6,805,074, of which the Federal government contributes $995,314. In 1895, in the Republic, there were 10,345,899 who could neither read nor write, and 323,336 who could read only. In 1893 there were, in the Republic, over 139 public libraries, including the National Library with 205,000 volumes, and eight other libraries with over 10,000 volumes each, 33 museums and three meteorological observatories. The number of newspapers published was 307.

The judiciary consists of the supreme court, with 15 judges chosen for a period of six years; nine circuit courts, and 38 district courts. The judicial power is independent of the executive.

Finance. The revenue and expenditures for the five years (1896–1901) are as follows:

Revenue.		Expenditure.	
1896–97	$51,500,629	1896–97	$48,330,505
1897–98	52,697,948	1897–98	51,815,286
1898–99	60,139,212	1898–99	53,499,541
1899–1900	64,261,078	1899–1900	58,309,934
1900–1901	63,283,196	1900–1901	59,423,006

These totals are estimated for each year ending June 30. The official returns for 1902 placed the revenue at $64,823,600 and the expenditure at $64,-738,816. Of the revenue, 50 per cent is derived from customs, 39 per cent from internal taxation, and 11 per cent from other sources. The public debt, June 30, 1901, was: External debt, gold, $112,512,300; and internal debt in silver dollars, $136,806,236. The fiscal value of property (one-third less than the actual value) in 1899, was $774,-471,488. The 11 mints coin annually an average of $20,000,000. Most of the silver coined into dollars is exported to China and the Eastern Archipelago.

Minerals. Mexico is rich in precious stones. For centuries, her people neglected all else and devoted themselves to mining. The country became impoverished, and the inhabitants ignorant and indolent. While, since the foundation of the present republic and the consequent prosperity, agriculture and other business have again been taken up, yet the mineral wealth of Mexico is still her chief attraction and source of income. By the wise forethought of the makers of the constitution, the great portion of the land became public property, to be sold or conceded, under certain conditions and restrictions. The mines remain the property of the state, the products going to the worker of the lodes only so long as he actively continues mining operations. Upon the suspension of operations, the mine reverts to the state. Thus speculation in mining properties is hindered, if not prevented. The difficulty of access to the mines has prevented the establishment of large plants equipped with modern machinery. The extension of the various railway systems will, in time, no doubt, do away with this hindrance. As yet, many of the primitive methods are employed in mining and reducing the ores. Silver is the most abundant mineral, occurring chiefly on the eastern slope of the Sierra Madre, while gold is found principally on the western slope. Other minerals found are lead, iron, copper, quicksilver, tin, cobalt, antimony, sulphur; coal and petroleum are also found. In 1899 there were, in the country, 1,142 mining enterprises, two-thirds belonging to Mexican companies. The total value of the output of ore for that year is given as $89,044,096. In 1899, the value of the gold output was $7,465,074, and of the silver, $96,974,819; of these several amounts there were exported in the same year, of gold $3,421,700; of silver $38,989,491. In 1895

there were 11 mints in Mexico. Every producer is free to have his bullion coined, the mints receiving 4.62 per cent for gold and 4.41 per cent for silver.

INDUSTRY AND COMMERCE. It is estimated that Mexico had, in 1895, 479 square leagues of forest, 18,134 square leagues of mountain land, and 4,822 square leagues of uncultivated land. The government offers inducements to colonization, and assists in the distribution of seeds and plants. The chief agricultural products are rice, maize, barley, wheat, and beans. Coffee, cocoa, and tobacco have recently been given more attention. In 1896–97 the coffee exported was valued at $9,876,532, and in 1897–98 at $10,649,119. Yucatan is the principal producer of henequen; the value of its export in 1897–98 was $11,564,519. There were 20,574 cattle-ranches in 1883. Northern Mexico possessed, on an area of about 300,000 square miles, 1,500,000 cattle, 2,500,000 goats, 1,000,000 horses, and 1,000,000 sheep. In 1893 there were, in Mexico, 2,899 factories for sugar and brandy; 123 for woolen and cotton goods; 41 for tobacco; total, 3,844.

The imports in 1899–1900 were valued at $61,304,914; the exports at $150,056,360. Of the imports, $31,020,136 came from the United States; of the exports, $116,098,456 went thither.

RAILWAYS, SHIPPING, ETC. In 1900 there were 9,027 miles of railway and 1,500 miles of tramway in operation. The telegraph lines were 42,150 miles in length, of which 28,560 miles belonged to the Federal government. There were 1,870 post offices, the receipts of which were $1,595,818, and the expenses $1,991,921. In 1898, in the foreign and coasting trade, 10,527 vessels of 4,085,200 tons entered, and 10,452 vessels of 3,880,940 tons cleared from Mexican ports.

DEFENSE. In 1900 the army consisted of 22,605 infantry, 7,249 cavalry, 2,289 artillery. Of the total, 2,068 are officers. Every Mexican capable of bearing arms is liable for military service from his twentieth to his fiftieth year. The navy consisted, in 1897, of 2 dispatch vessels, 2 unarmored gun-vessels, and a steel training-ship; and 4 gunboats and 5 torpedo-boats were being built.

MONEY AND MEASURES. The standard of value is silver. There is no paper currency except bank notes. The metric system of weights and measures became the legal standards in 1896, and the use compulsory.

MEXICO, a city and the capital of Audrain County, northeastern central Missouri, 108 miles N.W. of St. Louis, on the Chicago and Alton and the Wabash railroads. It is in a grain, hay and live-stock producing region. It is the seat of Hardin College, a military academy, and a seminary for women. Flour, fire-brick, wagons and plows are manufactured. Population 1900, 5,099.

MEXICO, a post village of Oswego County, northwestern central New York, 14 miles E. of Oswego, on the Rome, Watertown and Ogdensburg railroad and on Salmon Creek. It has a tannery, flour and grist mills, agricultural tool factory, cannery, foundry and carriage factories. Population 1890, 1,315; 1900, 1,249.

MEXICO, GULF OF. See MISSISSIPPI, Vol. XVI, pp. 543, 544; and UNITED STATES, Vol. XXIII, pp. 840, 841.

MEXICO, STATE OF, an inland district of central Mexico, in which is situated the capital of the republic. It is very mountainous, being in the center of the Anahuac Plateau. Its highest peak is the Nevado de Toluca, 14,020 feet high. The principal products of the state are silver, gold, mercury, sulphur, marble, cereals, and in the valleys cotton and sugar-cane are raised. Area, 9,247 square miles. Population 1900, 924,457. Capital, Toluca, with 23,150 inhabitants.

MEYER, ADOLPH BERNHARD, a German ethnologist and ornithologist; born in Hamburg, Germany, Oct. 11, 1840; graduated in philosophy and medicine from the universities of Göttingen and Vienna; studied also in Zürich and Berlin. After an extensive scientific journey through the Malay and Philippine islands, lasting three years, he was appointed curator of the Royal Zoölogical and Anthropo-ethnographic Museums at Dresden, Saxony, and after he entered his duties, published 16 volumes of reports and monographs concerning the contents of these museums. He wrote also *Abbildungen von Vogelskelette* (parts 1–21, 1879–94); *Die Hirschgeweihsammlung zu Moritzburg* (folio, with 62 plates, 1883–87); and *Album von Philippinentypen* (with 82 plates, 1885–89).

MEYER, HANS, a German traveler; born March 22, 1858, at Hildburghausen, Germany; studied at Leipsic, Berlin and Strasburg. Shortly after leaving the university he traveled extensively in India, Eastern Asia, America, the Philippine Islands and Africa. In 1888, accompanied by O. Baumann, he undertook a well-organized expedition to the Kilima Ndscharo, which was stopped by the insurrection that had taken place, in the mean time, in the district of the German East African Company. Meyer and Baumann were taken prisoners by the Arab chief Bushiri, robbed of all their property, and released only by the payment of a large ransom. On his return to Europe he published *Zum Schneedom des Kilima Ndscharo* (1888), with forty photographs. Accompanied by the Austrian mountaineer, Purtscheller, he soon undertook a new expedition. The Kibo was scaled, the highest peak of which was named the Emperor William's Peak, and was estimated to be about six thousand metres elevation. At the same time a large crater was discovered on the Kibo, and on its side the first glacier ever discovered in Africa.

MEYER, HEINRICH AUGUST WILHELM, a German Biblical scholar and commentator; born in Gotha, Germany, Jan. 10, 1800. He studied at Jena; was pastor at Osthausen, Harste, Hoyde and Neustadt; retired in 1848 and settled in Hanover. For forty years he was recognized, both in Germany and abroad, as a leader among modern commentators of the New Testament. His views were broadly liberal and closely in touch with the latest historical researches, while his faith in revelation remained stanchly orthodox. An English translation of his writings appeared in Edinburgh (20 vols., 1873–82) and in New York (11 vols., 1884–88). He died in Hanover, June 21, 1873.

MEYER, Johann Georg, a German genre painter, called after his native town of Bremen, where he was born Oct. 28, 1813, "Meyer von Bremen;" studied from 1833–1842 at Düsseldorf. He first devoted himself to the painting of Biblical subjects, such as *Death of Moses*. His first genre pictures were *Jubilee of a Hessian Minister; Return of the Warrior*. Since 1862 he chiefly painted pictures of children and home-life, like *Blind Man's Buff; The Young Mother*. In 1863 he became a professor, and died at Berlin, Dec. 3, 1886. G.A.S.

MEYER, Marie Paul Hyacinthe, a French palæographer and philologist; born in Paris, Jan. 17, 1840; graduated from the École des Chartes in 1861, and after being an *attaché* of the Section of Manuscripts at the National Library in 1863–65, was appointed one of the keepers of the National Archives from 1866 to 1872, and Secretary of the Écoles des Chartes from 1872 to 1875. He succeeded Edgar Quinet as professor of the languages and literatures of southern Europe at the Collège de France in 1876; and in 1882 he was placed at the head of the École des Chartes. He was awarded the 20,000-franc prize by the Institute in 1883, and in the same year was elected a member of that famous body. His life-work consists in discovering, editing and publishing rare manuscripts connected with Romance literature, French and Provençal especially; among these are *Le Roman de Flamenca* (1865); *Guillaume de la Barre* (1868); *La Chanson de la Croisade Contre les Albigeois* (2 vols., 1875–79). He wrote also *Recherches sur l'Épopée Française* (1867); *Mémoire sur les Dialectes de la Langue d'Oc au Moyen-âge* (1874); *Alexandre-le-Grand dans la Littérature Française du Moyen-âge* (2 vols., 1886).

MEYERSDALE, a borough of Somerset County, Pennsylvania, in the southwestern part of the state. It lies among mountains, on Castleman's River, is reached by the Baltimore and Ohio railroad, and had in 1900 a population of 3,024. W.F.J.

MEYNELL, Alice, poet and essayist; daughter of the late T. J. Thompson and sister of Elizabeth Thompson, Lady Butler (q.v.); was educated by her father, has written several volumes of poems and prose essays, and has edited an anthology of English poetry. She is married to Wilfrid Meynell (q.v., infra). W.F.J.

MEYNELL, Wilfrid, journalist and essayist; was born in England in 1852, and in 1877 married Alice Thompson (q.v., Alice Meynell, supra). He has published biographies of Benjamin Disraeli, Cardinal Newman and others, and has written much for reviews. W.F.J.

MEYRICK, Frederick, clergyman, teacher and author; was born in Wiltshire, England, on January 28, 1827, and was educated at Oxford. He became a tutor, examiner at the university, select preacher, inspector of schools in London from 1859 to 1868, and principal of Codrington College, Barbados, in 1886–87. He has been a voluminous writer, his works including *The Practical Working of the Church of Spain* (1851); *Papal Supremacy Tested by Antiquity* (1855); *Moral and Devotional Theology of the Church of Rome* (1856); *The Outcast and the Poor of London* (1858); *Kingsley and Newman* (1864); *Undergraduate Life at Oxford* (1872); *Is Dogma a Necessity?* (1883); *Justin Martyr* (1896); *Old Anglicanism and Modern Ritualism* (1901); *Ritual and Ritualism* (1901), and *Sabbath Observance* (1902). W.F.J.

MEZEREUM, a name given to *Daphne Mezereum*, a European shrub of the family *Thymelæaceæ*, with rose-colored flowers, in lateral clusters, in early spring, before the leaves appear, and red berries. It is cultivated for ornament.

MEZIERES, Alfred Jean François, author and statesman; was born in Lorraine, France, on November 19, 1836, and studied in the College of Metz, the College of Ste. Barbe, and the Normal School. He became a teacher and professor in various schools and colleges, reaching in 1861 the chair of foreign literature at the Sorbonne, and representing the University of Paris at the Shakespeare jubilee of 1864 and the Dante jubilee of 1865. In 1874 he was elected a member of the French Academy. Meantime he was also active in political affairs. In the revolution of 1848 he was an aide-de-camp to General Brea, and performed valuable services. In the Franco-Prussian War of 1870–71 he served in the National Guard. Soon afterward he was a candidate for a seat in the Chamber, but was narrowly defeated. In 1881, however, he was elected as a Republican, and had thereafter a distinguished career. He was an advocate of copyright legislation, and a champion of educational interests, but opposed the demand of the Clericals that Catholic seminarists be exempted from military conscription. He was a conspicuous and effective opponent of the Boulanger conspiracies, and did much for the reorganization of the army. Among his published books are several scholarly works on Shakespeare, Dante, Petrarch, Goethe, Mirabeau, and the war of 1870. W.F.J.

MIAGAO, a Philippine Island town on the S. E. coast of Iloilo, Panay. Pop. 22,100.

MIALL, Edward, an English clergyman; born in 1809. He served as an Independent minister at Ware, Hertfordshire, and afterward at Leicester, down to 1840, when he founded the *Nonconformist* newspaper. In 1844 he helped to establish the British Anti-State Church Association, known later as the Liberation Society, and devoted to agitating the separation of church and state; he sat in the House of Commons for Rochdale (1852–67), and for Bradford (1869–74). His devotion to the cause kept him poor but, in 1863, his friends gave him 5,000 guineas to which 10,000 more were added, in trust, for the needs of himself and family. He wrote *Title Deeds of the Church of England* and *British Churches in Relation to the British People*. He died at Sevenoaks, Kent, April 29, 1881.

MIAMI RIVER, a considerable stream of southwestern Ohio, which rises in Hardin County in the west-central part of the state, and flows south and west to the Ohio River fifteen miles below Cincinnati. It traverses a country of great

richness, supplies valuable water power to many towns, and has been of great service in their development. The chief places on it are Dayton, Franklin, Middleton and Hamilton. W.F.J.

MIAMI, LITTLE, a river about 25 miles E. of the Miami, and about parallel with it. It rises in Madison County, and enters the Ohio seven miles above Cincinnati. Its valley is fertile and hilly, and it is serviceable for its motive power.

MIAMI INDIANS, a title of the Algonquin family of Indians roving along the upper Great Lakes of North America, and occupying originally the basin of the Great Miami River. When met by French *voyageurs* in 1658, near Green Bay, large numbers of the Miamis lived in palisaded villages. Their hatred of the Iroquois caused them to take sides with the English in 1755–60, and they remained their allies during the Revolutionary War. They fought against the advance of the pioneers in 1790, and defeated General St. Clair in 1791; but General Anthony Wayne forced them to ask for peace in 1795. Again, in 1812–15, they took the field against the Americans. After 1818 they removed to Indiana; in 1846 they were transferred to a reservation on the Osage River, in Kansas; but soon their individuality as a tribe disappeared, and they are merged now with the Peorias and Quapaws, and numbered, according to the government report, 86 in 1895.

MIAMISBURG, a post village of Montgomery County, southwestern Ohio, 11 miles S. of Dayton, on the Miami canal, and on the Cleveland, Cincinnati, Chicago and St. Louis and the Cincinnati, Hamilton and Dayton railroads, in the center of the tobacco region of the Miami valley. It has fine water-power, several mills and factories, a foundry and excellent schools. Population 1890, 2,952; 1900, 3,941.

MIAMI UNIVERSITY, a non-sectarian institution of learning, located at Oxford, Ohio; chartered as a college in 1824; had existed as a grammar-school since 1809. As far back as 1802 the state of Ohio granted land in the township of Oxford, Butler County, for the establishment of a college, and has paid an annual amount for its maintenence. Since its organization, 1,093 students have graduated from Miami University. In 1901 it had 15 instructors, 144 students and 18,000 volumes in its library. The tuition fees are $10 per annum; the productive funds of the corporation amount to $45,000 and its revenues to $33,227.

MIANTONOMOH, an American Indian; sachem of the Narragansett tribe; born in Rhode Island in 1560. He concluded a treaty with the colony of Massachusetts in 1636 and conveyed to Roger Williams the extensive Providence region in Rhode Island. He professed friendship for the whites, and several times led his warriors against the Mohicans and other enemies of the colonists. Defeated in battle by Chief Uncas near Norwich, he sought refuge in Hartford but was afterward surrendered and put to death by Uncas at Sachem's Plain, Norwich, September, 1643. A granite monument was erected over his grave by the citizens of Norwich in 1841, which is said to be the first monument erected by a white man over the grave of an Indian. W.M.C.

MIASMA. See MALARIA, Vol. XV, p. 319.

MIAULIS, ANDREAS VOKOS. See GREECE, Vol. XI, p. 111.

MICAS. See MINERALOGY, Vol. XVI, pp. 430, 431.

MICA-SCHIST. See GEOLOGY, Vol. X, p. 210.

MICHAELMAS FESTIVAL. See MICHAEL, Vol. XVI, p. 234.

MICHEL, FRANÇOIS ÉMILE, a French painter and art critic; born in Metz, Lorraine, July 19, 1828; graduated from the Metz Lyceum in 1845; studied painting in his native city, under Migette and Marichal (the famous painter on glass); after 1853, when he made his *début* with *La Gardeuse d'Oieo*, he had one or two of his landscapes exhibited at the Paris Salon; was awarded medals in 1868 and 1889 at the International Exposition; and in 1892 was elected an associate member of the Academy of the Fine Arts and a member of the commission of paintings at the Louvre Museum. He took high rank as an art critic. He wrote *Le Musée de Cologne* (1883); *Les Musées d'Allemagne* (1885); *Rembrandt* (1886); *Hobbéma* (1890); *Jacob van Ruysdael* (1890). Among his most noted pictures are *Semailles d'Automne* and *La Dune près de Harlem*, both at the Luxembourg Museum, in Paris; *La Récolte des Olives* and *Chasse sur la Falaise*, both at the Metz Museum; *Nuit d'Eté*, at the Nancy Museum; *En Forêt* (1889); *Un Village Abandonné* (1890).

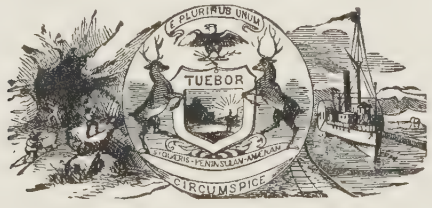
MICHEL, LOUISE, a French revolutionary leader; born in Vroncourt, France, in 1839; first distinguished herself by her poetical and musical talents, which were recognized and encouraged by Victor Hugo. In 1860 she opened a school in the Quartier Montmartre, Paris, and in 1871 took an active part in the doings of the revolutionary Commune, and when it collapsed (May, 1871) was made a prisoner and sentenced to transportation for life. On the amnesty to political prisoners in 1880 she returned to Paris, and, continuing to take part in Communist assemblies, she was reimprisoned in 1883, and again in 1886. She finally settled in London. She published her *Mémoires* (1886), an unsuccessful play based on a Communistic incident, and a novel, *Les Microbes de la Société*. She died January 9, 1905.

MICHELET, KARL LUDWIG, educator; born in Berlin, Germany, Dec. 4, 1801; was graduated at the University of Berlin in 1824. He became a strong exponent of Hegel's philosophy, whose works he early began to edit. In 1825 he was called to the chair of philosophy in the French gymnasium of Berlin, and three years later he was appointed professor of philosophy at the university. In his many political writings in 1848–49, he favored the revolutionists of the period. He was principally known, however, as the leader of the idealist party of Hegel's disciples, and devoted much of his life to extending the theories of his master. His works include *A System of Philosophy as an Exact Science; History of Recent German Philosophy*, etc. He died Dec. 16, 1893. G.J.H.

MICHELSON, Albert Abraham, physicist, was born at Strelno, in Poland, on December 19, 1852. He was educated at the United States Naval Academy, and at the Universities of Berlin and Heidelberg, and the College of France and Polytechnic School in Paris. He served in the navy for a time, but resigned in 1881 to become professor of physics in the Case School of Applied Science at Cleveland, Ohio. He filled a similar place in Clark University from 1889 to 1892, and since 1892 has filled the chief chair of physics in the University of Chicago. In 1878–80 he made a noteworthy series of experiments to ascertain the velocity of light. W.F.J.

MICHIE, Peter Smith, soldier and educator, was born in Scotland on March 24, 1839, and was brought to the United States in 1843, his parents settling at Cincinnati, Ohio. He was graduated from West Point in 1843, entered the engineer corps, and served throughout the remainder of the Civil War, being engaged in the siege of Charleston in 1863–64 and as chief engineer of the Army of the James, and the left wing of the Army of the Potomac, in 1864–65. At the close of the war he was made brevet brigadier-general of volunteers. Until 1871 he was assistant professor of engineering and chemistry at West Point, and thereafter professor of natural and experimental philosophy. He was also in 1870 a member of a military commission to investigate European methods of iron and steel making. He was the author of numerous text-books, on wave motion, sound and light, analytical mechanics, and hydrodynamics. He wrote also a *Life of General Emery Upton*. He died at West Point on February 16, 1901. W.F.J.

MICHIGAN, by the latest revised and corrected surveys, has an area of 58,915 square miles, of which



SEAL OF THE STATE OF MICHIGAN.

1,485 square miles are water surface. The population, according to the decennial census of 1900, was 2,420,982. The population in 1890 was 2,093,889; a gain in the decade (1890–1900) of 327,093 or 15.6 per cent. The relative rank of Michigan among the states in 1900 was ninth, the same as in 1890; the density of population (1900) was 42.2 to the square mile, and 747,334 of the inhabitants lived in the 26 cities of the state, constituting 30.9 per cent of the entire population. There were 1,248,905 males and 1,172,077 females; the percentage of native-born citizens was 77.6; of foreign-born 22.4; the number of negroes, 15,816, which was an increase of 593 since 1890.

The cereals are cultivated extensively in Michigan, 4,721,126 acres having been devoted to their growth in 1899; of which area 25 per cent was in corn, 38 per cent in wheat and 27 per cent in oats. The rank of the state in area devoted to the cereals was fourteenth, in the total production twelfth, the number of bushels having been 105,359,403. The production of wheat to the acre was large, 1,925,769 acres yielding 20,535,140 bushels. The number of farms in Michigan in 1880 was 154,008, which had increased to 172,344 in 1890 and to 203,261 in 1900. The acres in farms increased almost three million between 1890 and 1900, and the acres of improved lands in farms over a million and a half. Nearly thirty-one thousand more farms were cultivated by their owners in 1900 than were in 1890, and in the period between the two dates the value of the farms of the state increased more than twenty-six million dollars, and the value of farm implements and machinery appreciated more than six millions, the value of live-stock nine million and a half. The number of horses was increased seventy thousand, oxen nearly twenty thousand, milch cows sixty-six thousand, swine over thirty-nine thousand, and sheep (including lambs) three hundred and forty-eight thousand. The gain in the decade in the total value of farm property was $42,417,479 or 6.5 per cent. The census returns of 1900 give the total value of the farms, fences, buildings, machinery and farm implements and live-stock at $690,355,734; the number of horses, 586,559; the number of neat cattle, which included 563,905 milch cows, 1,376,408; the number of swine, 1,165,200; and the number of sheep, 1,625,930, from which were sheared 12,202,844 pounds of wool.

The chief agricultural industry is that of fruit-raising, the soil and climate being especially adapted to the culture of peaches. The peach belt is about two hundred miles in width, and extends across the state from east to west. Statistics gathered by the state authorities in 1900 show the number of peach trees on farms and in bearing to have been 8,104,415, the number of apple trees, 10,927,899, and the number of pear trees, 1,187,110. The same reports show that there were 10,465 acres in vineyards, and 339,309 acres in orchards, valued at $3,675,845. Grapes are grown in almost every county of the state, and numerous young vineyards not yet in bearing were found in all portions of the state bordering on Lake Michigan, which give promise of becoming prolific fruit-producing districts. Other small fruits, such as cherries, plums, and all kinds of berries grown in the latitude, are cultivated in all sections of the lower peninsula. The long coast line gives abundant facilities for shipping, and, in addition, there are almost seven thousand miles of railroad.

The second great industrial resource of the state is lumbering, which formerly held the first place. Forest fires and the wanton destruction of great bodies of timber have much decreased the output, which in 1900, according to the decennial census reports, amounted to $54,290,520 for the manufactured products alone, in addition to which the timber products manufactured amounted to $12,469,532. Shipments are made by both rail and water to all parts of the United States, and the lumber output

of 1894 amounted to more than four billion feet, and two billion five hundred million shingles.

The manufacturing industries of Michigan were in number 16,807, the capital invested at the time of the taking of the twelfth (1900) census amounting to more than $284,097,133. The number of employees at that time was 176,213, to whom were paid $79,030,722 in annual wages. The cost of the material used was estimated at $199,599,905, from which there were manufactured products of the total value of $356,944,082. As stated, lumber was the principal manufacturing industry, followed by flouring and grist-mill products of the value of $23,593,991. Other industries were foundry and machine-shop products, yielding $20,615,864; steam-railroad cars, $9,920,780; furniture factory product, $14,614,506; tobacco in various forms, $9,335,027; iron and steel, $5,902,058; carriages and wagons, $11,205,602; and ship-building, $4,432,101. Other industries that made returns over six million dollars were agricultural implements (almost four millions); chemicals; masonry, brick and stone; malt liquors; printing and publishing; slaughtering and meat-packing.

In the total value of mineral products Michigan stands second only to Pennsylvania. In iron ore the production was almost one half of the total amount mined in the United States, and the value of shipments was $13,707,899, from an output in 1899 of 9,146,157 tons. The expenditures at the mines were over $10,000,000, while the total of all mines was but little in excess of $24,000,000. There were employed, in the iron-ore mines, 13,120 men, to whom $6,353,741 were paid as wages for the year. The Commissioner of Mineral Statistics of Michigan makes the following report in relation to shipments of iron ore in 1895: From the Marquette district there were sent out 2,095,166 tons; from the Menominee district, 1,694,804 tons; from the Gogebic district, 2,560,775 tons; the total from the Lake Superior district being 10,438,268 tons.

Michigan bears the distinction of being first in the production of salt, as it is in iron ore, and is second in copper. For forty-three years the state stood first in copper, but in 1887 gave way to Montana, which produces more copper, only in the way of incidental constituent of other ores, and not reduced. In 1900, the entire Michigan mines produced 131,066 tons of refined copper. The metal has decreased in value from 36¼ cents per pound in 1865 to 10¾ cents in 1895, at which price the product of the year amounted to $13,929,189. The maximum output of coal was in 1882, when 135,339 tons were produced, but since then new coal fields have been opened, and the output in 1889 was 624,708 short tons. Although gold has been known to exist in several localities in Michigan, it was not until within recent years that any systematic mining was attempted; and $625,639 worth of the metal has been secured by the different mines. Silver has also been found in considerable quantities, and the value of the output from one mine, which also produces gold, was reported at $56,035 for the past ten years. In addition to the precious metals there are large deposits of stone of various kinds, such as sandstone, redstone, brownstone and grindstone, of which latter there was produced by one company, in 1895, 2,924 tons, of the value of $23,000. Bushed grindstones and scythestones also brought $18,842. Other deposits, which are not being worked to any great extent, but which are susceptible of producing almost unlimited quantities, are novaculite, slate, limestone, quartzite, kaolin, mica, peat, clay, granite, graphite, asbestos, gypsum and talc. Marble of many kinds, and of the best quality, is produced. Some is pure white, some variegated, shading from white to pink, green, gray and purple, and is susceptible of a polish almost equal to onyx. There are also deposits of serpentine, practically inexhaustible, which are of great value, for the reason that the only other known deposits are in Italy, where the supply is almost exhausted. The salt produced in 1900 amounted to 4,820,865 barrels. Although the territory in which salt is found embraces nine of the counties of the state, and the 110 companies now engaged in the manufacture of this staple have a combined capacity of 5,500,000 barrels annually, the reduced price has operated to keep the production at but little more than one half the capacity of the mills. The price has declined from $1.80 per barrel in 1866 to $48\frac{9}{10}$ cents in 1896, which latter price also includes the cost of the barrel, leaving no margin in the business, unless the manufacture is carried on in connection with the saw-mill business, so that the waste from the timber could be used as the fuel for the evaporation of the brine.

The report of the state treasurer for the fiscal year ending June 30, 1900, showed the disbursements to have been $2,635,605: the total receipts, $2,908,680. The balance remaining on hand was $290,417. The railroads of the state paid in taxes the sum of $1,240,845; the fire insurance companies, $126,246, and the life insurance companies, $78,740. At the date given, the bonded debt of the state amounted to $434,500 in war loan bonds, with an amount under the trust fund debt.

The report of the commissioner of the banking department, of the date of October, 1900, showed that there was deposited in the state banks $102,448,609,—a gain of $7,714,148 during the preceding year. The deposits in the national banks at the same date amounted to $61,174,664,—an increase of almost $1,000,000 over the same date the previous year, notwithstanding the loss of two banks within the time. The 194 state banks and four trust companies of the state had resources to the amount of $124,820,305, and in the 85 national banks the same items aggregated $34,228,618.

The railroads of Michigan had 8,240.02 miles in operation in 1900, the total cost of which had been $300,620,000. The 72 different lines reported the total receipts from operation for the preceding year at $29,293,409, the operating expenses $29,944,690, leaving a deficit of $97,362.

The report of the superintendent of public instruction shows the number of children between the ages of five and twenty to be 713,740, of whom 498,979 attended the public schools of the state. The number of districts that maintained schools was 7,969; the number of graded school districts, 597.

There were 74 schoolhouses built of stone, 1,361 of brick, 5,987 of frame and 347 of log. The total value of the school property of the state was given as $19,746,443. The number of male teachers employed was 3,479; of female, 12,711. To the former

STATE HOUSE, LANSING.

average monthly wages of $48 were paid; to the latter, $35.08. The total amount of teachers' salaries amounted to $4,312,245. The total receipts for the year amounted to $6,660,800; the expenditure was $5,883,369.

Michigan has many institutions of higher education, among which are the University of Michigan, at Ann Arbor (q.v., in these Supplements); Albion College, at Albion (q.v., in these Supplements), controlled by the Methodist Episcopal Church; Adrian College, at Adrian, controlled by the Methodist Protestant Church; Alma College, at Alma, under the management of the Presbyterian Church; Battle Creek College, at Battle Creek, under the direction of the Seventh-Day Adventists; Benzonia College, at Benzonia, managed by the Congregational Church; Detroit College, at Detroit, managed by the Roman Catholic Church; Hillsdale College, at Hillsdale, controlled by the Free Baptists; Hope College, at Holland, controlled by the Reformed Church; Kalamazoo College, at the city of that name, controlled by the Baptist Church; and Olivet College, at Olivet, controlled by the Congregational Church.

In 1890 the religious organizations of Michigan numbered 4,798, with 3,761 edifices, 569,504 communicants or members, which constituted 27.20 per cent of the entire population. The value of all church property was $18,682,971. The leading bodies were Adventists, 170 organizations; all Baptist bodies, 523; Roman Catholic, 406; Congregational, 331; Evangelical Association, 134; Lutheran Synodical Conference, 137; Lutheran Independent Synods, 164; all Lutheran bodies, 380; Methodist Episcopal, 1,085; all Methodist bodies, 1,578; Presbyterian, 236; all Presbyterian bodies, 252; Protestant Episcopal, 191; United Brethren, 302. The Roman Catholics led in the number of members and the value of church property.

The following table shows the charitable, correctional and penal institutions of Michigan, their location, average number of inmates and the cost of maintenance for the two years ending June 30, 1894:

Institution.	Location.	Average Number in Attendance.	Cost of Maintenance, Two Years, Ending June 30, 1894.
Michigan Asylum for the Insane	Kalamazoo.	1,154	$526,837
Eastern Michigan Asylum for Insane	Pontiac.	986	441,123
Northern Michigan Asylum for Insane	Traverse.	960	480,000
Michigan Asylum for Dangerous and Criminal Insane	Ionia.	206	86,788
Upper Peninsula Asylum for the Insane	Newberry.	---	(*)
State Public School	Coldwater.	220	------
Michigan School for the Deaf	Flint.	315	145,000
Michigan School for the Blind	Lansing.	63	43,000
Michigan Home for the Feeble-minded and Epileptic	Lapeer.	---	(†)
Michigan State Prison	Jackson.	833	250,577
State House of Correction	Ionia.	471	266,064
State House of Correction and Branch of State Prison	Marquette.	120	56,000
Detroit House of Correction	Detroit.	611	-----
Industrial School for Boys	Lansing.	473	145,000
State Industrial Home for Girls	Adrian.	232	83,127
State School for Dependent and Neglected Children	Coldwater.	325	105,000

The National Guard of Michigan is composed of five regiments of infantry, composed of 40 companies, and comprises 192 commissioned officers and 2,704 enlisted men, a total strength of 2,896. In 1894 there was organized a naval brigade, four officers commissioned, and the division located at Detroit.

Jan. 1, 1899, there were 805 newspapers published in Michigan. Papers were published in 82 of the 83 counties of the state, in 375 of the cities, towns, and villages, and in 81 of the county seats. Of the whole number, 69 were daily, 3 triweekly, 20 semiweekly, 641 weekly, 1 fortnightly, 6 semimonthly, 61 monthly, 2 bimonthly, and 2 quarterly.

The following are the principal cities of Michigan, with the population as given in the 12th census of 1900: Alpena, 11,802; Ann Arbor, 14,509; Battle Creek, 18,563; Bay City, 27,628; Detroit, 285,704; Flint, 13,103; Grand Rapids, 87,565; Ishpeming, 13,255; Jackson, 25,180; Kalamazoo, 24,404; Lansing, 16,485; Manistee, 14,260; Menominee, 12,818; Muskegon, 20,818; Port Huron, 19,158; Saginaw, 42,345; and West Bay City, 13,119.

State flower, Apple Blossom.

The following is a list of the governors of Michigan since 1836, the date of the admission of the state into the Union:

Steven T. Mason.....1836–40	William L. Greenley.....1847–48
William Woodbridge.....1840–41	Epaphroditus Ransom....1848–50
James W. Gordon.....1841–42	John S. Barry.....1850–52
John S. Barry.....1842–46	Robert McClellan.....1852–53
Alpheus Felch.....1846–47	Andrew Parsons.....1853–55

(*) Under course of construction. Appropriation made in 1893.
(†) Completed, August, 1895, and opened for inmates.

Kingsley S. Bingham.....1855–59	Russell A. Alger.....1885–87
Moses Wisner.....1859–61	Cyrus G. Luce.....1887–91
Austin Blair.....1861–65	Edwin B. Winans.....1891–93
Henry H. Crapo.....1865–69	John T. Rich.....1893–97
Henry P. Baldwin.....1869–73	H. S. Pingree.....1897–1901
John J. Bagley.....1873–77	A. T. Bliss.....1901–05
Charles M. Crosswell.....1877–81	Fred. M. Warner.....1905 —
David H. Jerome.....1881–83	
Josiah W. Begole.....1883–85	

See also MICHIGAN, Vol. XVI, pp. 246–249.

MICHIGAN, LAKE, the second in size, and the only one lying wholly within the United States, of the great fresh-water lakes. See also ST. LAWRENCE, Vol. XXI, p. 187.

MICHIGAN, UNIVERSITY OF, for the support of which Congress set apart 72 sections of land,

LIBRARY, UNIVERSITY OF MICHIGAN.

in 1826. It was located at Ann Arbor in 1837, the sum of $150,447 being realized by the sale of two townships of land. The university was opened Sept. 20, 1842, as a non-sectarian institution for both sexes. A medical department was added in 1850, a law department in 1859, and a homœopathic medical college in 1875. There is also a dental college and a special two years' course in chemistry. Degrees are conferred on the completion of the courses in the classical, philosophical, scientific, medical, law and engineering departments. Selected studies may be pursued for any period not less than one term, while there are post-graduate courses. Each department has its own faculty and is under its own management. All the faculties, comprising over 50 professors (exclusive of 183 additional instructors), constitute the university senate. The number of students in 1902 was 3,800. The library contains 156,000 volumes The astronomical and meteorological observatories are famed. The various laboratories are excellently equipped, while the numerous museums are well filled. In the department of art the collection is one of the finest in the United States, having been recently enriched by the Coldwater collection. The grounds cover 55 acres. University Hall has a frontage of 347 feet, and is surmounted by a dome rising 140 feet from the ground. The buildings were erected at a total cost of $700,000. The proceeds from the sale of lands donated by Congress made a fund of $543,000. The institution receives an annual grant from the state derived from a sixth-of-a-mill tax levied on the taxable property of the state. The total annual income, including fees, etc., amounted to (1901) $588,423. The university is under the control of a board of eight regents, elected by the popular vote of the state. The regents serve for a term of eight years; elections are held biennially for two regents, two retiring every two years. The president of the university is, *ex-officio*, a member and president of the board of regents. The first president was appointed in 1852. R.C.A.

MICHIGAN CITY, a city and port of Laporte County, Indiana, in the northwestern part of the state. It lies on the southern end of Lake Michigan, has an important commerce by land and sea, and is reached by the Lake Shore and Michigan Southern, the Lake Erie and Western, and the Louisville, New Albany and Chicago railroads. It has various wood-working establishments and car shops, and its population in 1900 was 14,850. W.F.J.

MICHIPICOTEN, Canada, an island belonging to the Algoma district, Ontario, 42 miles southeast of the mouth of the Michipicoten River in Michipicoten Bay, a deep inlet in the northeastern shore of Lake Superior. The island, 20 miles long, with a maximum width of 10 miles, has an irregular coast-line with numerous bays, and its highest point is 800 feet above the level of the lake. It has copper deposits, the mining of which has attracted a small population. The river rising in the divide between Hudson Bay and Lake Superior is a canoe route with a tortuous southwestern course of about 100 miles. C.L.S.

MICHOACAN, Mexico, a Pacific maritime state bounded north, east, and south respectively, by the states of Colima, Jalisco, Guanajuato, Mexico, and Guerrare. It has an area of 22,874 square miles and is very mountainous, the Sierra Madre rising along the western coast, and the Cordillera de Anahuac with the volcano of Jorullo and other high peaks extending centrally east and west. Lumbering, the mining of gold, silver and lead, farming and cattle-raising are the chief industries. The capital is Morelia. Population of state, 887,000. C.L.S.

MICMACS, a tribe of Algonquin Indians, among the first with whom the English came in contact. They remained hostile to the English and their colonies till 1760. They now number from 3,000 to 4,000, and are mostly in Nova Scotia, Newfoundland and New Brunswick. There is an *English-Micmac Dictionary* (Halifax, 1888).

MICROCOCCI. See SCHIZOMYCETES, Vol. XXI, pp. 420–423; and BACTERIOLOGY and SURGERY, AMERICAN, in these Supplements.

MICROPHONE. See TELEPHONE, Vol. XXIII, pp. 142–145.

MICROPYLE. See BOTANY, Vol. IV, p. 140.

MICROSCOPY, THE ELECTRIC LIGHT IN. The incandescent electric light is recommended very highly as a substitute for the usual lamps used in microscopy, or even for the direct daylight. A small lamp, which requires only one cell of a bichromate battery to operate it, and which can be adjusted to any position, is now made for this purpose. Among the advantages of the electric light are its intensity, which allows the use of very oblique rays in illuminating the object; the larger proportion of white and blue rays in the light, which brings out

the finer details more clearly; the small amount of heat given out, which enables the lamp to be placed as close to the condenser of the microscope as may be desired; and for certain lines of investigation, the doing away with the necessity of a mirror to reflect the light upon the object, since the lamp can be placed in any desired position in reference to it. It is also claimed that the light is less fatiguing to the eye than even ordinary daylight, while for purposes of microphotography the large proportion of actinic rays in the electric light and the ease with which it can be regulated render it far superior to any other illuminant.

MICROSPORANGIUM, a name used in heterosporous plants to indicate the sporangium or spore-case which contains the microspores. As the pollen-grains of seed-plants are microspores, the anther-sacs are microsporangia.

MICROSPORE, a name used in heterosporous plants to indicate the spore which develops the male gametophyte or prothallium, as distinguished from the macrospore which develops the female gametophyte. Pollen-grains are examples of microspores.

MICROTASIMETER, an instrument invented by Thomas A. Edison for the measurement of very minute expansion, or of pressure resulting from expansion. It is based on the well-known property of carbon, which receives greatly increased electric conductivity when subjected to pressure. The apparatus consists of a rigid iron frame having an upright at each end. In one end is a carbon button mounted between two platinum surfaces. The article to be tested is placed between the uprights, with one end resting against the carbon button, which is connected electrically with a galvanometer. Any expansion of the substance tested which ensues upon the application of heat is made manifest at once by the galvanometer, whose pointer indicates the degree of increased conductivity of the carbon, thus measuring the pressure. So delicate is this instrument that the heat of the hand, when held at a short-time distance from the substance tested, is very shortly manifest in the action of the galvanometer.

C. H. Cochrane.

MICROTOME, an instrument for cutting thin sections of portions of plants and animals. See also Zoölogy, Vol. XXIV, p. 855.

MIDDLEBORO, a village of Plymouth County, southeastern Massachusetts, nine miles E. of Taunton, on the New York, New Haven and Hartford railroad. Its principal industries are the manufacture of boots and shoes, straw goods and lumbering and farming. It has a national bank, a public library with 8,000 volumes, and several schools. Population of town, 1890, 6,065; 1900 (12th census), 6,885.

MIDDLEBURY, a post village and the capital of Addison County, central western Vermont, 34 miles S.W. of Montpelier, on Otter Creek, and on the Central Vermont railroad. It is the seat of Middlebury College, a co-educational, non-sectarian school founded in 1800, which in 1902 had 11 instructors, 116 students, and a library of 25,000 volumes. It has marble-quarries, good water-power, and manufactures flour, woolens, cotton, paper, leather, sashes and doors. Population town and village, 1900, 3,045.

MIDDLEPORT, a village of Niagara County, New York, in the extreme northwestern part of the state. It lies in a rich fruit and agricultural region, and has numerous industries, is thirty miles northeast of Buffalo, and is reached by the Erie canal, and the New York Central and Hudson River railroad. Its population in 1900 was 1,431. W.F.J.

MIDDLEPORT, a post village of Meigs County, southeastern Ohio, on the Ohio River, two miles below Pomeroy, and on the Kanawha and Michigan railroad. It is in an agricultural and coal-mining region, and has manufactories of iron, salt, carriages, woolen goods and furniture. It has a large trade, banks and several newspapers. Population 1890, 3,211; 1900, 2,799.

MIDDLETON, Arthur, an American patriot and signer of the Declaration of Independence; born in Middleton Place, Ashley River, S. Car., June 26, 1742. He was graduated from Cambridge University, England, and traveled in Europe until 1763. Soon after his return to America he took active part in the Revolutionary movements, and in 1776 was chosen one of the delegates to the American Congress. He took the field for the defense of Charleston in 1779. His plantation was devastated by the British and he was made a prisoner after the fall of Charleston in 1780. He was sent to Saint Augustine, and thence transferred to the Jersey prison ship. Exchanged in the latter part of 1780, he served till the close of the war as a delegate in the Continental Congress. He died in Goose Creek, S. Car., Jan. 1, 1787. W.M.C.

MIDDLETON, John Henry, an English educator and art critic; born in York, England, in 1846; graduated from Oxford, and was Slade professor of fine art in the University of Cambridge for several years after 1866, and a lecturer at the Royal Academy, London. At the time of his death, in June, 1896, he was art director at the South Kensington Museum; author of *Ancient Rome* (1888); *The Engraved Gems of Classical Times* (1891); *Illuminated Manuscripts in Classical and Mediæval Times* (1892). He prepared a number of monographs for this Encyclopædia, including Pottery and Porcelain; Rome: Its Topography and Archæology; and Schools of Painting; and wrote many articles for artistic and antiquarian periodicals.

MIDDLETOWN, a city of Connecticut. It has regular daily steamboat connection with New York and Hartford. It has five libraries, aggregating 75,000 volumes, national and savings banks, and good public schools. Wesleyan University (q.v., in these Supplements) is located here. Population 1890, 9,013; 1900, 9,589. See also Middletown, Vol. XVI, pp. 295, 296.

MIDDLETOWN, a town of Newcastle County, northern Delaware, 22 miles S. of Wilmington, on

the Philadelphia, Wilmington and Baltimore railroad. It is a great peach-shipping depot, and contains fruit-preserving establishments, carriage, farm-tool and harness factories. Pop., 1900, 1,567.

MIDDLETOWN, a city of Orange County, New York, in the southeastern part of the state. It lies in a rich agricultural region, at the foot of the Shawangunk Mountains, and is reached by the Erie and the New York, Susquehanna and Western railroads. It is the site of a large state asylum for the insane. Its population in 1900 was 14,522. W.F.J.

MIDDLETOWN, Ohio, a city of Butler County, in the southwestern part of the state. It is thirty miles north of Cincinnati, on the Miami River and is reached by the Cleveland, Cincinnati, Chicago and St. Louis, the Cincinnati, Hamilton and Dayton and several other railroads. Its population in 1900 was 9,215. W.F.J.

MIDDLETOWN, a post borough of Dauphin County, southeastern Pennsylvania, nine miles S.E. of Harrisburg, at the junction of Swatara Creek and the Susquehanna River, on the Union canal, and on the Pennsylvania and the Philadelphia and Reading railroads. It is in a lumbering and farming district, and is noted for its lumber trade and iron business. It contains the American Tube and Iron Works, Susquehanna Iron Works, Middletown Car Works, Cameron Iron Furnaces, a furniture factory, paint and chemical works, stove-works, and saw and planing-mills. It is the seat of the Frey Orphan School, and has banks, water, gas and electric lights, electric railways, and in the vicinity are limestone and brown sandstone quarries. Population 1890, 5,080; 1900, 5,608.

MIDGE. See WHEAT, Vol. XXIV, p. 565.

MIDLAND, Michigan, a city and the county seat of Midland County, in the east-central part of the southern peninsula of the state. It lies on the Tilliebawassee River, twenty miles northwest of Saginaw, and is reached by the Flint and Pere Marquette and the Michigan Central railroads. It is largely occupied with lumbering industries. Its population in 1900 was 2,363. W.F.J.

MIDLOTHIAN. See EDINBURGH, COUNTY OF, Vol. VII, p. 569.

MIDWAY, a city of Woodford County, Kentucky, in the northeast-central part of the state. It lies east of the Kentucky River, sixty miles east of Louisville, in a rich agricultural and stock-raising country, and is reached by the Louisville Southern and the Louisville and Nashville railroads. Its population in 1900 was 1,045. W.F.J.

MIFFLIN, THOMAS, an American soldier and politician; born in Philadelphia in 1744. He was of Quaker parentage; was graduated from Philadelphia College, in 1760; entered public life in 1772 as a member of the Pennsylvania assembly; and in 1774 was elected a delegate to the Continental Congress. In 1775 he entered the army with the rank of major, and as colonel and first aide-de-camp to Gen. Washington accompanied him to Cambridge. He subsequently held the appointment of adjutant-general, and in the spring of 1776 was commissioned as a brigadier-general. He fought in the battle of Long Island, and at the battle of Trenton did good service in driving back the enemy's line of cantonments from the Delaware. In 1777 he was made a major-general, and in the same year became an active member of the faction organized for the purpose of placing Gates at the head of the Continental Army, and known in history as the Conway Cabal. The project failing, he resigned his commission, and in 1782 was elected to Congress, of which body he became president during the following year. In 1785 he became speaker of the Pennsylvania legislature, and in 1787 was a delegate to the Constitutional Convention. In October, 1788, he succeeded Franklin as president of the Supreme Executive Council of Pennsylvania, which position he filled for two years. From 1790 to 1799 he was governor of the state. In 1794, he rendered important assistance to Washington in quelling the Whiskey Insurrection. He died in Lancaster, Pa., Jan. 20, 1800. W.M.C.

MIFFLINBURG, a borough of Union County, Pennsylvania, in the central part of the state, a little west of the Susquehanna River and forty-five miles north of Harrisburg, and is reached by the Pennsylvania railroad. It is in a farming country, but has manufacturing industries. Its population in 1900 was 1,436. W.F.J.

MIGNE, JACQUES PAUL, a French clergyman; born in Saint-Flour, October 25, 1800. He was graduated from the Orleans Seminary and in 1824 was ordained priest in the Roman Catholic Church. He held various charges until 1833, when he differed in opinion with the bishop of his diocese and removed to Paris. Here he founded the ultra-montane journal *L'Univers*, and also the *Imprimerie Catholique*, a church publishing house, where he also manufactured church organs and statuary. He published a long list of theological works by French clerical writers. He died near Paris, October 25, 1875. W.M.C.

MIGNET, FRANÇOIS AUGUSTE ALEXIS MARIE, a French historian; born in Aix, Provence, May 6, 1796. He studied at the College of Avignon, and in 1818 was admitted as an advocate at the same time as his fellow-student, M. Thiers, whose friendship he kept through life. Mignet soon became known as a Liberal journalist, and in 1824 appeared his *Histoire de la Révolution Française*, which, by its very impartiality and reserve, soon became a power in the state, and was by no means the weakest of the impulsive forces which hurried on the July revolution. As his reward, he chose the office of director of the archives at the Foreign Office, and held this post from 1830 to 1848, when Lamartine, the minister of foreign Affairs, deprived him of the appointment, and caused him to retire into private life. The access to the state papers was turned by him to admirable account, and a series of works appeared which are the result of research into unedited documents. They are *Negotiations Relatives à la Succession d'Espagne sous Louis XIV* (4 vols., 1836);

Antonio Perez et Philippe II (1845); *Vie de Franklin* (1848); *Histoire de Marie Stuart* (1851); *Charles Quint, son Abdication, etc.* (1854); and *La Rivalite de François Ier et de Charles Quint* (1875). He died in Paris, March 24, 1884. W.M.C.

MIGRAINE. See NEURALGIA, Vol. XVII, p. 373.

MIKADO. See JAPAN, Vol. XIII, pp. 592–594.

MIKLOSICH, FRANZ VON, a Slavic scholar and philologist; born in Luttenburg, Styria, Nov. 20, 1813. After studying law at the University of Gratz, he went, in 1838, to Vienna to practice as an advocate, but was led by Kopitar to the study of philology, and in 1844 obtained a post in the Imperial Library. From 1850 to 1885 he was professor of Slavic philology at Vienna, in 1851 being elected to the Academy of Sciences, made a life-member of the Reichsrath in 1862, and created a knight in 1868. He wrote *Vergleichende Grammatikder Slavischen Sprachen* (4 vols., 1852–74); *Etymologisches Wörterbuch der Slavischen Sprachen* (1886), the accepted authority on the subject. He died in Vienna, March 7, 1891.

MIKLUCHO-MACLAY, NICHOLAS DE, a Russian explorer and naturalist; born in Ukraine, in 1846. He was educated at the University of Berlin, studied at Göttingen and in 1867 made his first expedition in search of natural history specimens to the Canary Islands. The next year he traveled in Morocco and Asia Minor. In 1871 he went to the Far East and for eight years explored the South Sea Islands, New Guinea and the Malay Peninsula. He resided for a time in Batavia and contributed to several Dutch periodicals there. Later an account of his travels was published by the Imperial Geographical Society of St. Petersburg. His writings were confined to geography, zoölogy and botany. He died in Vienna, Austria, March 7, 1891. W.M.C.

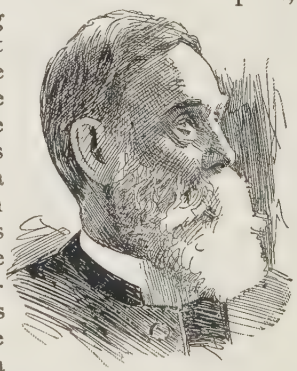
MILAN, a town of Sullivan County, Missouri, in the central-northern part of the state. It lies on Locust Creek, and is reached by the Chicago, Burlington and Kansas City and the St. Louis, Omaha and Kansas City railroads. It has coal, brick, stone and other industries, and is a fruit and grain market. Its population in 1900 was 1,757. W.F.J.

MILAN, a city of Gibson County, Tennessee, in the western part of the state. It lies among the headwaters of the Obion and Forked Deer rivers, ninety miles northeast of Memphis, and has some industries tributary to its agricultural and fruit-raising interests. It is reached by the Louisville and Nashville and Illinois Central railroads, and had in 1900 a population of 1,682. W.F.J.

MILAN OBRENOVITCH I, a king of Servia, second cousin of Prince Michel Obrenovitch III, who was assassinated in 1868; born Aug. 10, 1854, at Jassy. After the close of the Russo-Turkish war the complete independence of Servia was recognized, and its boundaries defined by the treaty of Berlin, July 13, 1878. Prince Milan married, Oct. 18, 1875, Natalie, daughter of the Russian Colonel Keschko, by his wife Pulcheria, Princess Stourdza. Servia was proclaimed a kingdom under King Milan I on March 6, 1882. In 1885 King Milan declared war upon Prince Alexander of Bulgaria, on the ground of the union of Bulgaria and Eastern Roumelia. His army had some success at first, but within a fortnight was driven back, defeated and crushed, within the Servian frontier. Milan, whose private life was of the worst, was divorced from his wife in 1888. They were reconciled *pro forma* in 1893. The Queen was always enthusiastically pro-Russian, and took no pains to hide her preferences. Finally, in March, 1889, King Milan was compelled to abdicate, which he did, in favor of his son, Alexander Obrenovitch, born Aug. 14, 1876, who, in April, 1893, overturned the regency and declared himself of age. He died at Vienna, Feb. 11, 1901 See also SERVIA, Vol. XXI, p. 722.

MILBANK, a city and the capital of Grant County, northeastern South Dakota, 117 miles N. of Sioux Falls, on the Wetstone River, and on the Chicago, Milwaukee and St. Paul railroad. It is in a grain and stock raising region, and has car-shops and a roundhouse of the railroad, flour and feed mills, and four grain-elevators. Population 1890, 1,207; 1900, 1,426.

MILBURN, WILLIAM HENRY, an American clergyman and author; born in Philadelphia, Sept. 26, 1823. Having suffered the loss of sight early in life he became widely known as the "blind preacher." He was educated at Illinois College, becoming a Methodist preacher in 1843. In 1845 he was elected chaplain of the House of Representatives. In 1893 he was made chaplain of the Senate. He died in Santa Barbara, Cal., April 19, 1903. He wrote *Rifle, Axe and Saddle Bags* (1857); *Ten Years of Preacher Life* (1859); *Lance, Cross and Canoe* (1866). W.M.C.



REV. W. H. MILBURN.

MILE, a measure of distance taking its name from the Latin *mille passuum*, "a thousand paces." The present English and American statute mile was fixed by Queen Elizabeth at 5,280 feet. Compared with it there is given below the length of the different measures of distance called miles in various times and countries.

English and American (U. S.) statute mile	= 1
Old Roman mile	= .9193
Geographical (or nautical) mile, or admiralty knot	= 1.153
Scotch mile	= 1.123
Irish mile	= 1.273
German mile (exactly four nautical miles)	= 4.611
German long mile	= 5.753
German short mile	= 3.897
Prussian mile	= 4.680
Danish	= 4.684
Swedish	= 6.648
Welsh mile	= about 4 English miles

MILES, Nelson Appleton, an American lieutenant-general; born at Westminster, Mass., Aug. 8, 1839. He came of an old colonial family, was educated in his native village and in Boston, and on the outbreak of the Civil War he was one of the first to raise a company of volunteers in defense of the Union. Commissioned a lieutenant in the Twenty-second Massachusetts Regiment, his military abilities met with speedy recognition. In May, 1862, he was promoted to lieutenant-colonel and transferred to the Sixty-first New York Regiment. Before September passed, he was colonel commanding the regiment He took a gallant part in the battles of Williamsburg, Seven Pines or Fair Oaks (where he was wounded), Gaines's Mills, Savage Station, White Oak Swamp, Nelson's Farm and Malvern Hill. He was seriously wounded at Fredericksburg, Dec. 13, 1862, and was left for dead at Chancellorsville. Of magnificent physique, he astonished the surgeons by reporting for duty in the autumn of 1863, and took part in the campaign of 1864, from the Wilderness to Petersburg and Richmond, serving in the final campaign of 1865. The inception of negotiations for Lee's surrender began in front of his lines near Appomattox, and only by the mere chance of Lee's riding in a different direction to wait for General Grant was it that the surrender took place where it did, instead of in front of General Miles's brigade. He had been promoted brigadier-general in May, 1864, in August brevetted major-general, and in 1865 appointed a major-general of volunteers. With peace and a reorganization of the army he became a colonel and brevet major-general, and in 1869 commanded the Fifth Infantry. He saw much Indian-fighting on the border, and was one of the moving factors in the winning of the West. He commanded the United States troops in Chicago in the railroad strike of 1894, and averted much bloodshed by his able disposition of his forces. In 1896 he became the general commanding the American army. During the Spanish war he conducted a successful campaign in Porto Rico. He published his *Personal Recollections* in 1896 and *Military Europe* in 1898. The age-limit of active service necessitated his retirement from the head of the United States army, August 8, 1903.

GENERAL NELSON A. MILES.

MILES CITY, a village and the capital of Custer County, southeastern Montana, 295 miles E. of Helena, on the Yellowstone River, and on the Northern Pacific railroad. It is the center of the cattle district of eastern Montana, and has steamboat traffic on the river. Population 1900, 1,938.

MILFORD, a town and seaport of New Haven County, central southern Connecticut, 10 miles S.W. of New Haven, on Long Island Sound, at the mouth of the Wopewaug River, and on the New York, New Haven and Hartford railroad. It manufactures straw goods, shoes, fish-oil, bone fertilizers, and has oyster-beds. It contains Elmwood School for Boys, a lyceum and library, and a soldiers' monument. The river is spanned by a granite bridge. Population 1890, 3,811; 1900, 3,783.

MILFORD, a town of Kent County, Delaware, 18 miles S.S.E. of Dover, on the Philadelphia, Wilmington and Baltimore railroad, and on Mispillion River. It is a shipping-point for farm and orchard produce, fruit raising and preserving being the principal industry. It has public schools and a preparatory school. Pop. 1890, 2,565; 1900, 2,500.

MILFORD, a town of Worcester County, Massachusetts, 17 miles S.W. of Worcester, on the Boston and Albany, the Grafton and Upton and the New England railroads. Principal industries the manufacture of shoes and straw goods, and granite-quarrying. It has two national banks, and a public library containing 9,772 volumes. Population 1890, 8,780; 1900, 11,376.

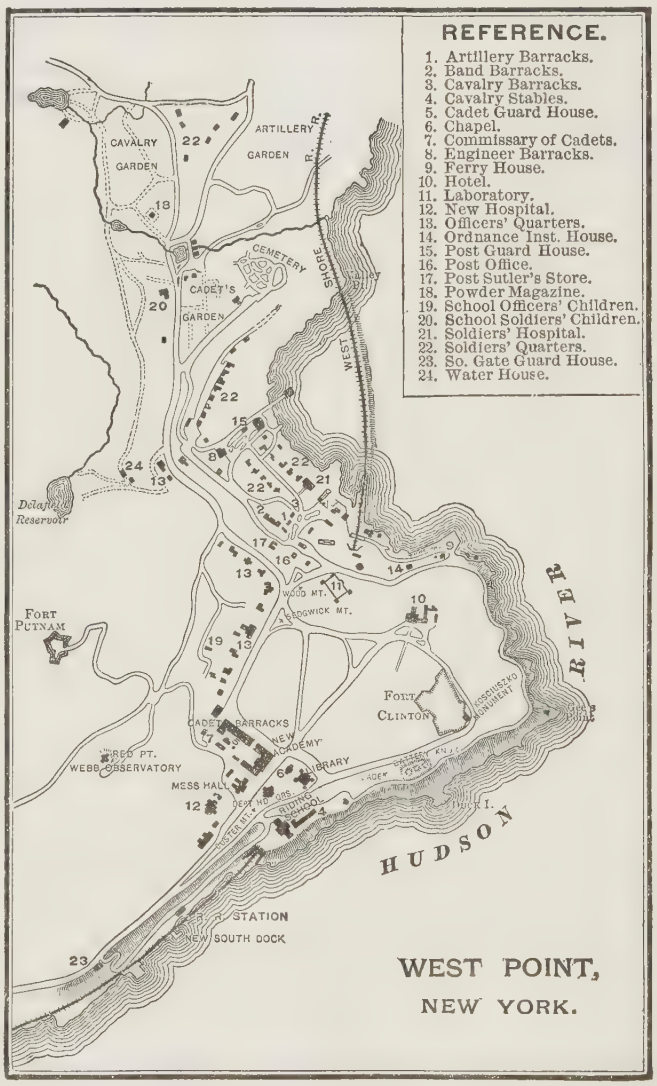
MILFORD, a post village of Oakland County, southeastern Michigan, 35 miles NW.. of Detroit, on the Huron River, and on the Flint and Pere Marquette railroad. It is in an agricultural region and has a foundry and several door-knob, farm-tool and other manufactories. Population 1890, 1,138; 1900, 1,108.

MILFORD, a town of Hillsboro, New Hampshire, in the southern part of the state. It lies on the Souhegan River, fifteen miles southwest of the important city of Manchester, and eleven miles west by north from Nashua. It has granite quarries, shoe factories, furniture factories and other industries, and is the chief shipping point for an extensive dairy region. It is reached by the Boston and Maine and the Fitchburg railroads, and has some popularity as a summer resort. Its population in 1900 was 3,739. W.F.J.

MILITARY ACADEMY OF THE UNITED STATES, The. The history of the Military Academy at West Point dates from the close of the Revolutionary War. Washington, Knox and other leaders urged the organization of an institution where officers might learn the art of war, as the surest way of preserving the exercise of the arts of peace. In 1794, Congress authorized the enrollment of a corps of artillerists and engineers to permanently garrison the forts at West Point, and it also provided for the attachment of 32 students or cadets to this force. This was the birth of the Military Academy. Four years later the corps was enlarged, instructors in arts and sciences were appointed, and a cadet was given definitive military rank, superior in grade to a sergeant, but inferior to the ensign, who is now termed a second lieutenant. The cadets became

BATTLE MONUMENT, WEST POINT.

part and parcel of the American army, and subject to its laws and regulations, the same as other commissioned officers. Formerly, they were enlisted for five years, but the period was extended to eight, so that the United States could claim their services for four years after graduation, but without a corresponding liability to regularly commission every graduate. Step by step the academy was enlarged, until in 1812 it had 260 students and took somewhat of its present form. The first superintendent was General Jonathan Williams, one of his professors being F. R. Hassler, afterward famous for his work in the Coast Survey. In 1817, Colonel Sylvanus Thayer, the "Father of the Academy," took command, and introduced the present uniform, organization and rules of study. Resigning in 1833, he was succeeded by other distinguished officers, among whom was Gen. (then Colonel) R. E. Lee, whose defection to the Confederate service was followed by 56 out of 278 cadets. Of 1,249 living graduates at the beginning of the Civil War, 919 remained loyal, 283 enlisted in the Confederate Army, and 47 were either neutral or their addresses were unknown.



The commandant and officers detailed to the post at the present day serve only four years, while the professors, with the assimilated rank of lieutenant-colonel or colonel, after ten years' service are appointed for life, or rather during satisfactory service. The academic staff is divided into 11 departments: Natural and experimental philosophy; drawing; mathematics; chemistry, mineralogy and geology; history, geography and ethics; civil and military engineering; law; tactics; modern languages; practical military engineering; and ordnance and gunnery. A fencing-master, teacher of music, and dancing-master complete the staff.

The cadets are formed into a battalion of four infantry companies, each commanded by a regular officer of infantry detailed for the purpose, and officered, under him, by cadets from the upper classes. A cadet adjutant ranks next to the four cadet captains. The various buildings occupied for the purposes of the Military Academy are picturesquely grouped around the wooded slopes of the post. The Riding School is the first encountered by a visitor landing from a steamboat or arriving by railroad. Near by are the stables with quarters for 100 horses. Facing the river is Grant Hall, or Mess Hall, as it is more familiarly known. The building contains a collection of fine portraits of famous American soldiers. Near by are the Hospital and Administration Buildings, the latter the post headquarters. Then comes the Plain, an open, level area of some forty acres. On the right is a dusty expanse, where field-pieces are packed under canvas covers, and where the mounted drills of cavalry troops and the light-battery take place. At the left is the campus of the Academy and parade of the post. Here the infantry battalion drills and dress-parades occur. The Chapel, a stone building with a Greek portico, was built in 1836, and the Reformed Episcopal form of worship is conducted there by the post chaplain. It is small and old-fashioned, and peculiarly adorned. The most interesting objects are the cases of captured flags. Among the trees is the camp-ground of the cadets, where they live in tents from graduation day in June until September. Beyond this shady camp-ground rises the grassy parapet of Fort Clinton. The present fortification was made in 1857, and is an object lesson in the science of field fortification. The battalion is quartered in a great quadrangular, castellated structure of Tudor architecture, the four stories of which contain 176 rooms. It was completed in 1849, the Academic building in 1893, and these, with Grant on

Mess Hall, are the principal buildings on the post, (See also WEST POINT, in these Supplements).

CADETS' QUARTERS, MILITARY ACADEMY.

Cadet Appointments. Each Congressional district and territory—also the District of Columbia—is entitled to have one cadet at the academy, the cadet to be named by the Representative in Congress. There are also ten appointments at large, specially conferred by the President of the United States. The number of students is thus limited to 367. Appointments are usually made one year in advance of date of admission, and may be made either after competitive examination or given direct, at the option of the Representative. The Congressman, should he desire, may nominate a legally qualified alternate, who will be examined with the regular nominee and admitted in the event of his success and the latter's failure to pass the prescribed preliminary examinations.

Appointees to the Military Academy must be between 17 and 22 years of age, free from any infirmity, and able to pass a careful examination in reading, writing, orthography, arithmetic, grammar, geography, and history of the United States.

About one fourth of those appointed usually fail to pass the preliminary examination, and but little over one half the remainder finally graduate.

The discipline is very strict, even more so than in the army, and the enforcement of penalties for offenses is inflexible rather than severe. Academic duties commence September 1st and continue until June 1st. Examinations are held in January and June, and cadets found proficient in studies and correct in conduct are given the standing in their class to which their merits entitle them, while those deficient either in conduct or studies are discharged. At the end of the second and fourth years a furlough is granted to a cadet, for the purpose of a visit home.

From about the middle of June to the end of August cadets live in camp, engaged only in military duties and receiving practical military instruction.

The number of students at the academy is usually about three hundred.

Upon graduating, cadets are commissioned as second lieutenants in the United States army. The pay of a cadet is $540 a year, out of which his mess, uniform and other personal expenses are defrayed.

Public attention has frequently been drawn to the practice of hazing newcomers in vogue at the academy, or to use a cadet euphemism, "the reduction of a plebe to his proper level of absolute insignificance." Allowing for natural coloring to such stories, the fact remains, that owing to the firm stand taken by President Cleveland in refusing to reinstate cadets dismissed for cruelty to their juniors, the practice of hazing is far from frequent, and, when detected, certain to meet with severe punishment.

A few details as to post-graduate instruction are appropriate. In order to add a special professional training for the graduates of the Military Academy, and also to give the needed opportunity for full technical instruction to those who have received their commissions from civil life or from the ranks of the army, post-graduate schools have been opened at Fortress Monroe, Virginia; Fort Leavenworth, Kansas; Willet's Point, New York; and Fort Riley, Kansas. These schools are also maintained by the United States government. The school at Fortress Monroe, Virginia, was commenced in 1867. It has a two years' course. It is intended for subalterns of artillery, yet officers of other arms of the service have, by special permission of the Secretary of War, been educated there. The school at Fort Leavenworth, Kansas, began in 1882. It is designed for the training of infantry and cavalry officers. The school at Willet's Point, New York, was established in 1865. It is intended for the education of officers of the engineer and artillery corps. The course covers two years. Special attention is given to permanent works; their construction and management; also to torpedoes and to the electrical service. The school at Fort Riley is devoted to the light artillery and cavalry branches of the service.

MILITARY COLLEGES AND SCHOOLS. The most notable military school maintained by a state is the Virginia Military Institute. It ranks next to the United States Academy. This school is located at Lexington, Virginia. It has eight professors, and is modeled after the West Point school in its general plan, instruction and discipline, but its diplomas confer no military titles. It has usually about 150 students.

The Kentucky Military Institute is similar. It has existed since 1846, being located first at Frankfort, and now at Farmdale, Kentucky. It has 11 professors, and instructs usually about 130 students. There are a number of other military schools, especially in the Southern states; some are also maintained privately in New York, Massachusetts, Vermont, Pennsylvania, Ohio and Michigan.

Since 1883 the general government details forty commissioned officers of the army to act as professors of military science and tactics at certain designated academies and colleges, some of which have accepted from the United States certain grants of land for educational purposes. It has been stipulated in the grants, and made obligatory upon each institution so helped, that military training should be included in its course of studies. The above-named army officers are distributed among the several states, as nearly as possible according to the population. Recently, however, state institutions which introduce a military branch of instruction are preferred in the distribution of these military instructors. The number of students over 15 years of age attending these institutions is about 8,000. Of this number, about 4,000, or 50 per cent, attend infantry drill.

MILITARY ORDER OF FOREIGN WARS. See Colonial Societies, in these Supplements.

MILITARY ORDERS. See Monachism, Vol. XVI, p. 735.

MILITIA (from Latin *miles*, "a soldier") has now the acquired meaning of the domestic force organized for the defense of a nation, as distinguished from the regular army, which can be employed at home or abroad, in either defensive or aggressive operations. Under its military law every nation has a reserve upon which its defense would fall in case of insufficiency on the part of the regular army; but the system differs in each country, and, with the exception perhaps of the United States during peace, none is formed after the model of the British militia (q.v., Vol. XVI, pp. 312–314).

The constitution of the United States (art. I, sec. 8, declares: The Congress shall have power . . . . To provide for calling forth the militia to execute the laws of the Union, suppress insurrections and repel invasions. 16. To provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the states, respectively, the appointment of the officers and the authority of training the militia according to the discipline prescribed by Congress."

In article II, section 2, we read: "1. The President shall be commander-in-chief of the army and navy of the United States, *and of the militia of the several states* when called into the actual service of the United States."

The second amendment to the constitution is worded as follows: "A well-regulated militia being necessary to the security of a free state, the right of the people to keep and bear arms shall not be infringed."

Congressional enactments require the enrollment, in each state, of all non-exempted, able-bodied male citizens between the ages of 18 and 45, and establish the rules of their organization and the system of their discipline. The fact is however, that this organization, etc., is only prospective, having never been practically realized, except in so far as the Federal government appropriates yearly about $400,000 toward the National Guard or volunteer organizations of the different states. Even during the Civil War, the President had no recourse to the militia laws to raise the necessary troops. Yet the accompanying table will show what armed forces could be mustered if the United States militia were called into active service in accordance with the age-limit.

The official census of the population of the United States (1901) gives 10,880,707 as the total of males of militia age; i.e., between 18 and 45. This is reduced from 13,230,168 in the statements furnished by the War Department up to Jan. 1, 1890. The same department gives the following figures relating to the present total strength of the National Guard now under arms as entered upon the state rosters and filed with the department:

Generals and general staff-officers	952
Cavalry (rank and file)	5,574
Infantry (rank and file)	111,641
Naval reserve (rank and file)	4,679
Total	122,846

The total authorized strength of the militia in all the states is 187,204

Congress appropriates yearly $400,000 to be divided among the states according to the representation to which each is entitled in Congress, and among the territories and in the District of Columbia in such proportions as the President may direct. The largest Federal appropriation is that granted to New York state, $41,000, the state itself expending over $400,000 annually in defraying the expenses of its National Guard.

The armament consists, for the infantry, of Springfield rifles, caliber .45, of all models from that of 1873 to the latest; New York National Guard carry the Remington, caliber .50; three regiments of Connecticut National Guard use the Peabody, .45. Except in New York, Pennsylvania, Georgia and Oregon, the cavalry use the regulation arms of the United States army. The total artillery armament includes 252 muzzle-loading field-pieces, 102 Gatling guns and 11 howitzers. There are 19,614 tents of all styles available.

Nearly all the states and territories have special camping-grounds, whereon the state troops assemble, in detachments, for from five to ten days, yearly, for purposes of drill and campaign training. For the strength of the militia in the various states, see the individual states, in these Supplements.

MILK, Adulteration of. See Milk, Vol. XVI, pp. 314–318.

MILK-FEVER, in lower animals. See Veterinary Science, Vol. XXIV, p. 221.

MILK-SNAKE (*Ophiobolus eximius*), a harmless snake of the family *Colubridæ*, inhabiting the eastern United States. It is yellowish gray in color, with a series of dark spots on the back and sides. It is also called chicken-snake, and is one of the so-called king-snakes.

MILK-SUGAR. See Sugar, Vol. XXII, p. 657.

MILK TREE, any tree exuding a milky juice (latex) which can be used for food, notably certain tropical trees of various families. They are sometimes called cow-trees.

MILKWEED, a name given to the numerous species of the genus *Asclepias*, and referring to the fact that the plants abound in latex, which exudes in milk-like drops from wounds, but becomes viscous and hard upon exposure to the air. The plants are common everywhere, and are characterized by the production of very peculiar flowers adapted to insect-pollination.

MILKY WAY. See Astronomy, Vol. II, p. 716.

MILLAIS, Sir John Everett, an English artist; born in Southampton, June 8, 1829. He was a student of drawing from a very early age, and at eleven years entered the Royal Academy School. In 1846 he exhibited his first picture *Pizarro Seizing the Inca of Peru*, and received the gold medal for an historical painting *The Tribe of Benjamin Seizing the Daughters of Shiloh* (1848). With William Holman Hunt,

and others, he assisted in founding the Pre-Raphaelite Brotherhood, and in 1849 exhibited his first picture in the new style, which was afterward to become celebrated. The picture was not named, but was a representation of the child Jesus in the shop of his reputed father, Joseph the carpenter. This picture shadowed forth all the great qualities, no less than the defects, of the great painter. It was harsh, uncouth, and mediæval in its drawing and perspective, but it was full of thought, invention, richness of color, and displayed great power over pencil and brush. Millais, unlike Rossetti and Holman Hunt, did not remain faithful to the methods of the school as he grew older. In 1852 he painted his *Huguenot* and *Ophelia;* then followed the *Order of Release* and the *Proscribed Royalist.* In 1856 came *Autumn Leaves*, and in 1860 the *Vale of Rest.* These are very memorable pictures, for while they do not exhibit the bold and masterly brush-work of his after years, they display a sufficient command of technical resources, united to a poetical feeling and an indescribable sense of the pathos and mystery of life. *Autumn Leaves* depicts some ruddy and meditative children round a bonfire, in an enclosed garden, and under the gleams of a wild and saddened sky. *The Vale of Rest* which was painted from a scene actually beheld by the artist, as he was driving through France, shows the garden of a convent, with nuns digging a grave. That was about the end of Millais' deeply poetic painting in the pre-Raphaelite manner. His later pictures began with *My First Sermon* (1863) and *My Second Sermon* (1864); then followed *Stella* (1868); *Vanessa* (1869); *Knight Errant* (1870); *Chill October* (1871); *Flowing to the River* (1871); *The Fringe of the Moor* (1874); *The Northwest Passage* (1874), and the *Ornithologist* (1895). In 1880 he turned his attention to portraiture and produced portraits of some of the foremost men of the day. He was made an academician in 1864; was decorated with the Legion of Honor in 1878, elected a member of the Academie des Beaux Arts in 1882, created a baron in 1885, and was elected president of the Royal Academy in 1896. He will be best remembered as the acknowledged head of that body of innovators in modern art termed the "pre-Raphaelite" school. He was a splendid colorist, a genius in technique, and a great modern master. He died in London, England, August 13, 1896.

W.M.C.

SIR JOHN E. MILLAIS.

MILLBURY, a town of Worcester County, Massachusetts, in the southeast-central part of the state. It is a few miles southeast of the city of Worcester, on the upper part of the Blackstone River, and is reached by the Boston and Albany and New York, New Haven and Hartford railroads. It is largely devoted to manufacturing, producing a great variety of textiles, hardware, electric supplies, vehicles, etc. Though tributary to Worcester, it has its own banks, public library, and other institutions. Its population in 1900 was 4,460.

W.F.J.

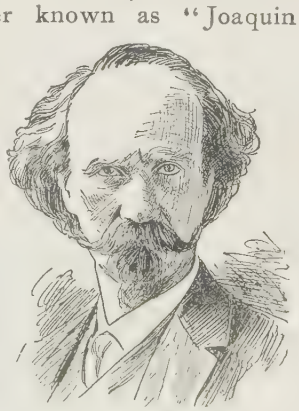
MILLEDGE, John, an American patriot and statesman; born in Savannah, Ga., in 1757. He was a grandson of one of the early Georgia colonists, and took an active part in the war against Great Britain. On June 17, 1775, he participated in the capture of Sir James Wright, royal governor of the colony. He also rendered service in the siege of Savannah by the French fleet. Milledge became active in political affairs and at the close of the Revolution was appointed Attorney-General of Georgia. He was a member of Congress for ten years and in 1802 was elected Governor of Georgia. He was a United States Senator from 1806 to 1809, and in the latter year was elected president *pro tem* of the Senate. He was one of the founders of the State University and also of the city of Athens. The town of Milledgeville was named in his honor by special act of the State legislature. He died in Augusta, Georgia, February 9, 1818.

W.M.C.

MILLEDGEVILLE, a city and the county seat of Baldwin County, Georgia, in the central part of the state. It lies on the Oconee River, in a cotton-growing and manufacturing region, eighty miles southeast of Atlanta, and is reached by the Central railroad of Georgia, the Middle Georgia and Atlantic, and the Georgia railroads. It was once the state capital, and still retains some state institutions, including a penitentiary and an asylum for the insane, and is the seat of a normal school and an agricultural college, and of various cotton mills, brick and pottery kilns, and other industries. Its population in 1900 was 4,219. See Milledge, John, supra.

W.F.J.

MILLER, Cincinnatus Heine, an American poet and author, better known as "Joaquin Miller"; born in Wabash County, Ind., Nov. 19, 1841. He removed with his parents to Oregon in 1850; ran away from home; went to the California gold mines; accompanied Walker on the Nicaragua filibustering expedition; lived among the Indians and the Spaniards of the Pacific slope; studied law for a few years; practiced unsuccessfully in Idaho, where he soon turned express messenger. In 1863 he settled in Oregon for a short time, becoming editor of the



JOAQUIN MILLER.

Eugene City *Democratic Register*, which was suppressed in the same year because of its treasonable character. In 1864 he began to practice law in Canon City, Ore., made himself popular by his services against the warlike Snake Indians, and from 1866 to 1870 was judge of Grant County. His first volume of poems, published in 1871, won great favor in England, and Miller, who went to London in the same year, was styled "the American Byron." He visited London again in 1873; lived in Washington, D. C., until 1887, when he returned to California, settling near Oakland. Among his published works are *Songs of the Sierras* (1871); *Songs of the Sun-Lands* (1873); *Songs of the Desert* (1875); *First Families of the Sierras* (1875); *The Baroness of New York* (1877); *Songs of Italy* (1878); *Shadows of Shasta* (1881); *Mine Own Story* (1881); *The Danites* (1881); *Collected Poems* (1882); *Gold Seekers of the Sierras* (1884); *Songs of the Mexican Seas* (1887); *The Building of the City Beautiful* (1894). W.M.C.

MILLER, Samuel Freeman, an American jurist; born in Richmond, Kentucky, April 5, 1816. He was graduated from the medical department of the Transylvania University in 1838. He began practice in Richmond, but soon removed to Barboursville, Knox County, and in 1850, went to Pennsylvania where he became prominent as a jurist. In 1862 he was appointed justice of the United States Supreme Court by President Lincoln. His decisions gave him a national reputation and he became noted for his opposition to the encroachments of railroad corporations. In 1877 he was a member of the Electoral Commission, and in 1887 was the orator of the Centennial Constitution celebration held at Philadelphia. He died in Washington, October 13, 1890. W.M.C.

MILLER, Warner, an American statesman; born in Hannibal, New York, August 12, 1838. He was graduated from Union College in 1860 and became professor of Greek and Latin at the Fort Edward Collegiate Institute. He served in the Civil War, attaining the rank of lieutenant. He was a delegate to the National Republican Convention in 1872 and was elected to the New York legislature in 1874. He served in Congress from 1879 to 1881, and in the latter year when T. C. Platt resigned from the United States Senate, Miller was elected to fill the vacancy, serving as Senator till 1887. In 1888 he was nominated for governor of New York by the Republicans, but failed of election. Later he was president of the Nicaragua Canal Company. W.M.C.

MILLER, William Hallows, a British crystallographer and mineralogist; born near Llandonery, Wales, in 1801. He was graduated from Cambridge, where he became a fellow of Saint John's in 1826. For two years he was a tutor and in 1832 became professor of mineralogy in Cambridge. He was engaged from 1843 to 1854 in constructing a new standard of weight and length for the government. He served on several royal commissions, was foreign secretary for seventeen years to the Royal Society and published an edition of Philip's *Mineralogy*. He was especially distinguished for his system of crystallography. He died in London, England, May 20, 1880. W.M.C.

MILLER, William Henry Harrison, an American jurist; born in Augusta, N. Y., Sept. 6, 1840. He was educated, at Hamilton College, and in 1862 entered the army, serving until the close of the Civil War. He began the practice of law at Fort Wayne, Ind., in 1866, and in 1874 removed to Indianapolis, where he formed a partnership with Benj. Harrison. When the latter was elected to the presidency, he chose Miller to be Attorney-General. In 1894 Judge Miller resumed the practice of law in Indianapolis. W.M.C.

MILLERITES. See Adventists, XXV, 52.

MILLERSBURG, a village and the capital of Holmes County, northeastern central Ohio, 35 miles S.W. of Canton, on the Killbuck Creek, and on the Baltimore and Ohio and the Cleveland, Akron and Columbus railroads. It is in an agricultural and coal and iron mining region, and contains flour and lumber mills, a furniture factory, brick and tile works, a foundry and a machine-shop. The place is lighted with electricity. Population 1890, 1,923; 1900, 1,998.

MILLERSBURG, a borough of Dauphin County, Pennsylvania, in the southeast-central part of the state. It is on the Susquehanna River, twenty miles north of Harrisburg, and is reached by the Northern Central railroad. It is an important coal market, and has a number of vehicle factories and other industries. Its population in 1900 was 1,675. W.F.J.

MILLERSVILLE, a post village of Lancaster Co., Penn., 4 miles S.W of Lancaster. It is in a wheat and tobacco raising country, and contains a cigar factory and the Millersburg State Normal School, with about 800 students. Pop., 1900, 1,341.

MILLET, Aimé, a French sculptor; born in Paris, September 27, 1819. For some years he studied painting and drawing under David d'Angers and the architect Violett-le-Duc. He first applied himself to painting and exhibited a picture at the Paris Exhibition of 1842. He meanwhile had turned his attention to the plastic arts and exhibited his first statue, a *Bacchante*, in 1845. This was followed by his *Ariadne*, now in the Luxembourg Museum, a *Mercury* and a statue of *Civic Justice;* the statue of a *Young Girl*, for a monument in the cemetery of Montmartre and an *Apollo* for the façade of the new Paris opera house. His other works include the statues of Châteaubriand, Denis Papin and numerous busts. His style has all the realism of modern sculpture. He won gold medals at the Paris expositions of 1867, 1878 and 1889, and was made an officer of the Legion of Honor in 1870. He died in Paris, January 13, 1891. W.M.C.

MILLET, Francis Davis, an American artist and author; born in Mattapoisett, Massachusetts, November 3, 1846. He was educated at Harvard College and participated in the Civil War as a drummer and assistant surgeon.

He studied art in Antwerp under Van Lerius and De Keyser, winning silver and gold medals of honor in 1872 and 1873. In the latter year he was appointed secretary of the Massachusetts commission to the World's Fair in Vienna, and was also a juror at that exhibition. He was correspondent of the London *Daily News* during the war between Turkey and Russia in 1877 and received the Roumanian Iron Cross in 1877, and the war medals of Russia and Roumania in 1878; also the orders of Chevalier of St. Anne and of St. Stanislas from the Russian Government in 1877. His literary work includes contributions to the daily journals as correspondent, and various critical articles and short stories in magazines. He designed the costumes for the representation of the *Œdipus Tyrannus* of Sophocles that was given in Cambridge by Harvard students in 1880. Among his paintings are portraits of Charles Francis Adams, Jr., and of Samuel L. Clemens, exhibited at the National Academy in New York, in 1877; also *Bashi Bazouk* (1878); *The Window Slat* (1884), and a *Difficult Duet* (1886). In 1898 he was in the Philippines as the correspondent of the London *Times* and *Harper's Weekly*. As an artist he is best known as a painter of genre subjects of England in the eighteenth century and of classic Rome and Greece, in which costume and interiors are studied with much detail. W.M.C.

MILLIKEN'S BEND, a village of Madison Parish, Louisiana, a few miles above Vicksburg, Mississippi. Also, a bend in the Mississippi River at that point. In June, 1863, it was the scene of important military operations connected with the siege of Vicksburg. W.F.J.

MILLING-MACHINE. The use of the milling-machine in the manufacture of machinery, etc., is increasing steadily, and each year it usurps more of the work that was formerly given to the planer. The milling-cutter is really a circular-file, and the scientific formation of its cutting edges is understood much better than formerly. As a result, we have larger and better milling-machines, many of them resembling planers, and having several cutters mounted horizontally across the bed. For gear-cutting, nothing compares with the milling-machine. Brown and Sharpe have cut a sixty-tooth six-inch face-gear, three-diametral pitch, in thirty minutes, feeding at the rate of 18 inches a minute. Brooks has built a milling-machine which can finish one side and two edges of a piece having a total surface of 220 square feet at one operation. With the Brown and Sharpe feed of 18 inches per minute this Brooks machine could surface a piece of cast-iron 20 x 8 feet surface, 20 inches thick, on one side and two edges, in 30 minutes, at a cost of less than one dollar. The principal forms of milling-machine now manfactured are the "Lincoln," of which Pratt and Whitney alone have built over 5,000; the pillar-and-knee form, as exhibited in the Brown and Sharpe "Index" machine; and the planer form, as built by Brooks and Ingersoll. The recent patterns turn out work that is as accurate as that of any other machine-tools, and the quality of the work performed on them has improved steadily with the reduction in cost of production. C. H. COCHRANE.

MILLS, CHARLES KARSNER, neurologist; born in Philadelphia, Pa., Dec. 4, 1845; was educated at the Central High School of Philadelphia and graduated at the medical department of the University of Pennsylvania in 1869. Two years later he received from that institution the degree of Ph.D. He devoted himself principally to nervous diseases, and in a few years became a specialist in that branch of medical science. He held a number of important positions in hospitals and medical schools; was called as an expert in many medico-legal cases, and long served as clinical professor of nervous diseases at the medical department of the University of Pennsylvania. He is the author of *A Treatise on the Nervous System and Its Diseases*, etc. G.J.H.

MILLS, CLARK, sculptor, was born in Onondaga County, N. Y., on December 1, 1815, and was left an orphan in childhood. He became a millwright and afterward a plasterer at Charleston, S. C., and while engaged in the latter trade began to model in clay. He made in 1846 a marble bust of John C. Calhoun, which was purchased by the city and placed in the city hall of Charleston. He then removed to Washington, and under a commission from Congress made the famous statue of Andrew Jackson which stands in Lafayette Square in Washington. This statue was made from cannon captured by Jackson, and was cast at a foundry built by Mills for the purpose. His next important commission was the execution of the equestrian statue of Washington, for the National Capital, which was unveiled on February 22, 1860. Later he cast at his foundry Crawford's statue of *Freedom*, which crowns the dome of the Capitol, and which is commonly but incorrectly called *Liberty*. Mills died on January 12, 1883. W.F.J.

MILLS, DARIUS OGDEN, financier and philanthropist, was born at North Salem, N. Y., on September 25, 1825, became one of the foremost bankers and railroad proprietors of California, amassed a great fortune, and has been a generous patron of many philanthropic enterprises in New York and elsewhere. W.F.J.

MILLS, ROBERT, an American architect and engineer; born in Charleston, S. C., Aug. 12, 1781. As a youth he was a pupil of the celebrated architect, Benjamin Latrobe. In 1820 he was state engineer of South Carolina. He supervised parts of Independence Hall in Philadelphia; designed the state capitol at Harrisburg, Pa., and constructed a single-arch bridge over the Schuylkill river. He erected custom houses and marine hospitals in various parts of the United States and the Washington Monument in Baltimore. In 1837 he was appointed architect of the general government at Washington, where he built the Treasury, General Post Office and Patent Office buildings

and designed the Washington Monument. He published: *Statistics of South Carolina* (1826); *American Pharos, or Lighthouse Guide* (1832); *Guide to the Executive Offices* (1841); and numerous pamphlets. He died in Washington, D. C., March 3, 1855. W.M.C.

MILLS, Roger Q., an American statesman; born in Todd County, Kentucky, March 30, 1832; settled in Texas and practiced law at Corsicana. He served a term in the state legislature; in 1872 was elected to the House of Representatives of the Forty-third Congress, as a Democrat, and held that office by successive re-elections until March 23, 1892, when he was elected United States Senator. Mr. Mills was re-elected for the term ending March 3, 1899.

MILLS, Samuel John, an American clergyman; born in Torringford, Conn., April 21, 1783. He entered Williams College in 1806, and in 1808 was one of the founders of a society whose members consecrated themselves to foreign missionary work, the first foreign mission organization in America. He graduated in 1809, and then spent some months at Yale, studying theology and endeavoring to enlist recruits for missionary work. In 1810 he entered Andover Theological Seminary, and in that year, with the aid of others, took such action as led to the formation of the American Board of Commissioners of Foreign Missions. He was licensed in 1812, and in that year and in 1814 went on missionary tours in the South. He was ordained in 1815, and spent the next two years in Albany, New York, Philadelphia, and Washington in the promotion of his great enterprise. Among the results of his labors were the organization of the American Bible Society and of the American Colonization Society, and the establishment of city missions in New York. In November, 1817, the Colonization Society sent Mr. Mills to Africa to select a site for a colony. On his voyage Mr. Mills died at sea June 16, 1818. E.E.T.

MILL SPRINGS or FISHING CREEK, a hamlet in Wayne County, Kentucky, on the Cumberland River, about eighty miles S. of Lexington. The immediate vicinity was the scene of an engagement, Jan. 19, 1862, between the Federal forces under General George H. Thomas and the Confederates under General George B. Crittenden. The Federal army consisted of about 8,000 men and the Confederate, of about 5,000. Thomas had placed his troops in a strong position and was assaulted at night by the Confederates, led by General Zollicoffer. The attacking party was repulsed with loss, among the killed being Zollicoffer. The loss to the Federals was 232 killed and wounded, and to the Confederates, 339 killed, wounded and taken prisoner.

MILLVILLE, a manufacturing city of Cumberland County, New Jersey, in the southern part of the state. It lies on the east side of the Maurice River, which is navigable to that point, 36 miles south of Camden. Its chief industries are glass factories and cotton mills, the former being among the largest in the state. It is reached by the West Jersey and Seashore railroad, and by an electric road from Bridgeton. Its population in 1900 was 10,583. W.F.J.

MILMORE, Martin, an American sculptor; born in Sligo, Ireland, Sept. 14, 1844. He graduated from the Boston Latin School in 1860 and began the study of art in Boston in the studio of Thomas Ball. In 1863, having established his own studio, he executed for the Sanitary Fair the statuette *Devotion*. The following year he went to Rome where he remained two years, making busts of Pius IX and others. Returning to Boston he reopened his studio and executed busts of Ralph Waldo Emerson, Theodore Parker, Charles Sumner, Wendell Phillips, and other New England celebrities. He designed the Soldiers' and Sailors' Monument on Boston Common, which was dedicated in 1877, the Soldiers' Monument at Charlestown, Mass., a composition *America* at Fitchburg, Mass., and *The Weeping Lion* at Colby University, Waterville, Me. His bust of Sumner is in the Metropolitan Museum, New York; and a bronze copy of the bust of Phillips is in the Boston Public Library, to which it was presented by the Phillips Memorial Association in 1900. He also executed three granite figures of *Ceres*, *Flora*, and *Pomona* for Horticultural Hall, in Boston. One of his best known works is the granite Sphinx in Mount Auburn Cemetery, Cambridge, Mass. His last work was a bust of Daniel Webster for the state capitol at Concord, N. H. He died at Roxbury Highlands, Mass., July 21, 1883. W.M.C.

MILNE-EDWARDS, Henri, a French zoölogist; born in Bruges, October 23, 1800. He studied medicine at Paris and at first practiced as a physician, but eventually became a writer and teacher of science. In 1838 he was elected to succeed F. Cuvier at the Académie des Sciences, became professor of entomology in the Museum in 1841 and in 1843 professor of entomology and of comparative physiology in the Faculte des Sciences, of which he became dean, retiring in 1876. He propounded the principle that the more an animal exhibits in its organs a "division of labor" the higher is it in the scale of organization, and his labors in the lower forms of animal life did much to reconstitute zoölogy. He published a monumental work in fourteen volumes, *Leçons sur la Physiologie et l'Anatomie Comparee* (1857–81). He died in Paris, France, July 29, 1885. W.M.C.

MILNER, Lord Alfred, G.C.B., G.C.M.G., governor of Cape Colony and British High Commissioner in South Africa, was born in 1854 and educated in London and at Oxford. He had a distinguished scholastic career and was subsequently admitted to the bar, but for a time pursued journalistic work, until he was appointed private secretary to the Rt. Hon. G. J. Goschen, then chancellor of the exchequer. In 1889 he became under-secretary of finance in Egypt and served under Lord Cromer. In 1892 he published an important work entitled *England in Egypt*, and in 1897 was created a G. C. M. G. and made governor of the Cape. In this post, in which he succeeded Lord Rosmead, he has

shown great skill and ability, especially in his negotiations with the Boer ex-presidents, Mr. Kruger and Mr. Steyn, in June 1899 at Bloemfontein, before the outbreak of the war with the Transvaal and the Orange Free State. Since then his personality has been "the focus of South African controversy."

MILNES, Monckton. See Houghton, Lord, in these Supplements.

MILO, an island. See Melos, Vol. XV, p. 850.

MILTON, a town and the county seat of Santa Rosa County, Florida, in the northwestern part of the state. It lies at the entrance of the east fork of the Blackwater River into the head of Pensacola Bay, and has a good harbor equipped with wharves and a dry dock. It has a large lumber and fruit trade, is reached by the Louisville and Nashville railroad, and in 1900 had a population of 1,204. W.F.J.

MILTON, a town of Norfolk County, Massachusetts, in the eastern part of the state. It lies on the Neponset River, in the southern suburbs of Boston, on the New York, New Haven and Hartford railroad, and is within the reach of the metropolitan street railway system. It has considerable manufactures, and is a center of market gardening for the supply of Boston. It contains an academy which was chartered in 1798, a fine public library, and other institutions. Its population in 1900 was 6,578. W.F.J.

MILTON, a post borough of Northumberland County, eastern central Pennsylvania, 33 miles below Williamsport, on the Susquehanna River, and on the Pennsylvania railroad and the Philadelphia and the Pennsylvania canal. It has a library, 22 graded public schools, banks, etc. Its industries include axle-forges, bolt, nut and washer works, fly-net factories, steam tannery, manufactories of lumber, car-works, machine-shops, agricultural works and foundries; also a rolling-mill and a nail factory. It was destroyed by fire in 1882, but recovered rapidly from the catastrophe. Population 1890, 5,317; 1900, 6,175.

MILWAUKEE, a city of Wisconsin. Milwaukee has become famous for its lager beer, of which there were sold, in 1892, 2,023,100 barrels, an increase over 1891 of 145,943 barrels. According to the census of 1900, Milwaukee reported 110 industries, with 3,342 establishments, having a capital of $110,363,854, employing 52,680 hands; $24,722,485 were paid for services, while the output was $123,786,449. Milwaukee ranks seventh in the lake traffic. The total tonnage of the freight movement by water in Milwaukee was, in 1890, 1,935,808. The indebtedness of the city is about $5,300,000, nearly half of which is water debt. The water brought from the lake is distributed from a large reservoir 150 feet high. There is an efficient system of public schools, 43 in number, including the high schools, with an enrollment of 29,000 pupils. The principal buildings lately constructed are the new custom-house and post-office (cost, $1,500,000); the Industrial Exposition building, the Layton Art Gallery, besides some handsome churches and depots. The city has a public library. There is an efficient fire department of 252 men, with 18 steam fire engines, 17 hose-carriages, 8 hook-and-ladder trucks, 1 fire-boat, and 7 chemical engines. There are over 44 miles of paved streets, and over 197 of streets otherwise improved, 210 miles of sewers, and 202 of water-mains. Several bridges are turned by electricity. By the laws of 1891 a park board was created; 600 acres of land in various localities have been purchased and a system of parks planned. Milwaukee has a good system of electric railways, and is lighted with arc-lights. It is very healthful, as is shown by its death rate, 1.7 per cent. The population of Milwaukee in 1890 was 204,468, about one-half German; 1900, 285,315, a little less than a third German. See also Milwaukee, Vol. XVI, pp. 352, 353.

MIMAMSA. See Sanskrit, Vol. XXI, pp. 303, 304.

MIMES or MIMI. See Drama, Vol. VII, pp. 354–357.

MIMICRY. See Heredity, in these Supplements.

MIN or AMMON. See Egypt, Vol. VII, p. 622.

MINA. See Numismatics, Vol. XVII, p. 646.

MINA-BIRD or MYNA. See Grackle, Vol. XI, p. 24.

MINARET. See Mosque, Vol. XVI, p. 891.

MINAS, the capital of a wild, mountainous province (area, 4,844 square miles; pop. [1900] 36,085) of the same name in southern Uruguay, 75 miles by rail N.E. of Montevideo. Population, 9,000.

MINAS GERAES, the most populous state of Brazil, has an area of 221,890 square miles. Population 1898, 3,484,099. Lying wholly in the table-land, its surface is occupied with grass and bush-covered campos, rising, however, in the Serra do Espinhaco to 5,900 feet. The principal rivers include the navigable São Francisco and the Rio Grande, which unites with the Paranahyba to form the Paraná. Agriculture and stock-raising are the chief industries. Some gold is still obtained, and diamonds, iron and lead are mined. Capital, Ouro Preto, with a population of about 60,000.

MINCIO. See Italy, Vol. XIII, p. 445.

MIND. See Psychology, Vol. XX, pp. 44–49.

MINDANAO. See Philippine Islands, Vol. XVIII, p. 766.

MINDELEFF, Cosmos, an American archæologist; born in New York city, in 1863. His parents were Russians. He was educated in a private school and as early as 1876 took up the study of American ethnology. In 1882 he became connected with the United States Bureau of Ethnology in Washington and for several years devoted himself to the study of the aboriginal peoples of New Mexico and Arizona. He has published *The Influence of Geographic Environment* (1897) and a series of articles upon *Pueblo Arts and Sciences* (*Scientific American*, 1898). He and his brother, Victor Mindeleff, prepared the first exhaustive report on Pueblo architecture, and Cosmos made elaborate plans for the restoration of the Casa Grande cliff dwellings in Arizona.

He has been unusually successful in making models of archæological remains which are of great value to science. W.M.C.

MINDEN, a town and the capital of Webster Parish, northwestern Louisiana, 28 miles E.N.E. of Shreveport, on Bayou Dorcheat, and on the Minden railroad, which connects with the Vicksburg, Shreveport and Pacific. Cotton and lumber are the chief articles of export. It has a college for women and the Minden Academy or high school. Population 1890, 1,298; 1900, 1,561.

MINDEN, a city and the capital of Kearney County, central southern Nebraska, 30 miles W. of Hastings, on the Burlington and Missouri River and the St. Joseph and Grand Island railroads. It is surrounded by good farming country, and has a creamery, mills, brickyards, wagon and milling works. Population 1900, 1,238.

MINDORO. See PHILIPPINE ISLANDS, Vol. XVIII, p. 766.

MINEOLA, a flourishing town of Wood County, northeastern Texas, 80 miles E. of Dallas, on the Texas and Pacific, the International and Great Northern and the Missouri, Kansas and Texas railroads. It is in a cotton, live-stock and lumbering region, and is the trade and shipping center for a considerable area. Population 1890, 1,333; 1900, 1,725.

MINER, ALONZO AMES, an American clergyman; born in Lempster, N. H., Aug. 17, 1814. He was graduated from the secondary schools, was a teacher for several years, and was ordained to the Universalist ministry in June, 1839. From 1848 to 1852 he was a colleague of Hosea Ballou in Boston. He founded Tuft's College, Medford, Mass., and was its president from 1862 to 1874. He was chairman of the American peace society in 1889. He edited the *Star of Bethlehem* at Lowell, and published *Bible Exercises* (1854) and *Old Forts Taken* (1878). He died in Boston, June 14, 1895. W.M.C.

MINERAL POINT, a city of Iowa County, Wisconsin, in the southwestern part of the state. It is 115 miles west of Milwaukee, and has lead mines and smelting works, machine shops and other industries. It is reached by the Chicago, Milwaukee and St. Paul railroad, and had in 1900 a population of 2,991. W.F.J.

MINERAL SPRINGS. See GEOLOGY Vol. X, p. 240; and MINERAL WATERS, Vol. XVI, pp. 450–456.

MINERAL WAX. See *Ozocerite*, under MINERALOGY, Vol. XVI, p. 447.

MINERAL WOOL. See IRON, Vol. XIII, p. 314.

MINER'S INCH, a unit for measuring water, which is defined as "the amount of water that will pass in 24 hours through an opening 1 inch square under a pressure of 6 inches." This unit of measurement is peculiar to the Western states of America, and used not only for mining purposes, but whenever it is desired to measure the amount of water distributed for irrigation. The average discharge from such an opening (called "a module") is one and one half cubic feet per minute. In the various states, from Colorado to California, there are some slight variations in this unit.

MINERSVILLE, a post borough of Schuylkill County, central eastern Pennsylvania, four miles W. of Pottsville, on the Philadelphia and Reading and two local railroads, and on the west branch of the Schuylkill River. Coal-mining is the chief industry, and the town contains water-works, a fire department, foundries and an anthracite furnace. It has a public library, and is lighted with electricity and supplied with city water. Population 1890, 3,504; 1900, 4,815.

MINGHETTI, MARCO, an Italian statesman; born in Bologna, Sept. 8, 1818. He supplemented a course at his university by a prolonged tour in France, Germany and Great Britain. With the election in 1846 of Pope Pius IX, Minghetti started a journal in aid of his country's regeneration. He fought with the Lombards under King Charles Albert until the defeat at Novara, and was many times promoted. In 1859 he was Secretary-General of Foreign Affairs, but resigned in 1860, becoming Minister of the Interior the following year, under Cavour and Ricasoli. In 1862 he was Minister of Finance under Farini, and in 1863, president of the council. In 1864 he concluded with the Emperor Napoleon the "September Convention." In 1868 he was Italian minister in London and thereafter Minister of Agriculture. In 1870 the collapse of the second empire brought with it the dissolution of the September Convention, and Rome became the capital of Italy and seat of government. From 1873 to 1876 Minghetti was Prime Minister for the second time, and, among many useful measures, earned his country's gratitude by effecting the "parraggio," or financial equilibrium between her outlay and income. For the next ten years Minghetti was still the most prominent member of the Italian Parliament. His lectures and essays on Raphael and Dante illustrate, on the æsthetic side, a catholicity of culture which, in the sphere of practical politics, is visible in his treatises on *Economica Publica* (1859); and *La Chiesa e lo Stato* (1878). He died in Rome, Dec. 10, 1886. *Revised by* R.W.C.

MINICOY ISLAND. See LACCADIVES, Vol. XIV, p. 184.

MINIE BALL. See GUNMAKING, Vol. XI, p. 250.

MINIMS OR MINIMI, ORDER OF THE. See FRANCIS OF PAOLA, Vol. IX, p. 612.

MINING SCHOOLS. See TECHNICAL SCHOOLS, in these Supplements.

MINISTERS. See INTERNATIONAL LAW, Vol. XIII, p. 199.

MINIUM, a mineral pigment. See MINERALOGY, Vol. XVI, p. 403.

MINNEAPOLIS, a city and the county seat of Ottawa County, Kansas, in the north-central part of the state. It lies on the Solomon River, 107 miles west of Topeka, on the Union Pacific and Atchison, Topeka and Santa Fé railroads, and is the center of a rich agricultural region, with some manufacturing industries tributary thereto. Its population in 1900 was 1,727. W.F.J.

MINNEAPOLIS, a city of southeastern Minnesota. Although the city is at the nominal head of navigation of the Mississippi River, only two lower-river steamboats have landed at the Minneapolis docks for eighteen years. It has good railroad facilities, being on the Chicago, Milwaukee and St. Paul, the Northern Pacific, the Great Northern, the Minneapolis and St. Louis and five other large railroads. The city railroad system, now operated by electricity, is continuous with the St. Paul system and controlled by the same company. The city is lighted with electricity, and controls its own water-works. The most striking buildings are the Chamber of Commerce, the Exposition Building, the West Hotel, the Lumberman's Exchange, and the residence of W. D. Washburn, costing $1,000,000. It also contains opera-houses, city and county buildings, engine-houses, banks, schools and several seminaries and professional schools. Situated here are the State University, Hamline University, Augsburg Theological Seminary, and Macalester College. The parks of Minneapolis comprise 1,155 acres and are valued at $3,918,400. In connection with these are 19½ miles of boulevards and parkways. This property was acquired mainly by direct purchase at about one fifth of its present value. It costs to maintain this system about $25,000 a year. Lake Harriet Park covers 415 acres, and the park surrounding the Falls of Minnehaha, made famous by the poet Longfellow, 173 acres. Minneapolis is essentially a wheat and lumber center. It is the chief shipping and manufacturing center of all the timber regions of the upper Mississippi Valley. More than half the wheat raised in Minnesota is made into flour by the mills of this city, something over 20,000,000 bushels per annum being ground here. The Pillsbury "A" mill is the second largest in the world, having a maximum capacity of 25,000 bushels per day. Nearly all the money paid for grain in the interior is sent from Minneapolis by elevator companies and millers. The elevator capacity of Minneapolis, not including the storage capacity of the mills and mill-elevators, is 15,415,000 bushels. The city is the greatest primary wheat market in the world; 41,734,095 bushels of wheat were received and 12,877,370 bushels shipped from Minneapolis, as compared with 15,973,285 bushels received and 10,916,604 bushels shipped from New York, which ranked next. The table of the industrial establishments of the city given above is taken from the United States census of 1900.

The climate of Minneapolis is healthful and bracing. In the vicinity are numerous beautiful lakes, which afford fine boating, fishing and bathing, and the surrounding country affords good hunting. These advantages have made Minneapolis quite popular as a summer and autumn resort.

The city now covers an area of 53 square miles; and on the east its city limits coincide with those of St. Paul. Population 1890, 164,738; 1900, 202,718. See also MINNEAPOLIS, Vol. XVI, p. 497.

INDUSTRIAL ESTABLISHMENTS.	NUMBER OF ESTABLISHMENTS REPORTING.	CAPITAL.	EMPLOYEES.	WAGES.	VALUE OF PRODUCTS.
Lumber and timber products	13	$12,900,046	3,017	$1,490,262	$12,285,305
Planing-mill products	14	1,244,311	900	380,970	2,329,769
Flouring and grist mill products	12	14,322,061	2,071	1,321,998	49,673,568
Other industries	2,329	29,241,786	20,620	9,515,293	46,654,401
Total	2,368	57,708,204	26,608	12,708,523	110,943,043

MINNEHAHA CREEK, the outlet of Minnetonka and other lakes, flows into the Mississippi River midway between St. Paul and Minneapolis. It has a beautiful perpendicular fall of fifty feet, which forms a popular resort for tourists. Longfellow named the principal female character of his *Song of Hiawatha* for these falls.

MINNESÄNGER. See GERMANY, Vol. X, p. 469.

MINNESOTA, in 1900, had a population of 1,751,395, its relative rank among the states

SEAL OF THE STATE OF MINNESOTA.

being twentieth. In 1890 the population was 1,301,826, the rank twenty-sixth, the gain in the ten years amounting to 34.5 per cent. The area of the state is 83,365 square miles, of which 4,160 is water surface and 79,205 land surface. The density of population is 22.1 to the square mile, having increased from 16.4 in 1890, 5.55 in 1870 and 2.17 in 1860. The 3 chief cities of the state had a population of 418,752, constituting 28.37 per cent of the whole, more than double the percentage of 1880. The number of males (1900) was 932,490; of females, 818,904. The percentage of native-born citizens was 71.1; that of foreign-born, 28.9. The number of negroes in Minnesota was 4,959 in 1900,—an increase of 1,276 since 1890. The number of Chinese in the year 1900 was 166; of Japanese, 51; of Indians, taxed, 7,414, of Indians, untaxed, 1,768.

The total number of farms in Minnesota in 1900 was, 154,659,—an increase of almost 38,000 since 1890; the average size was 169 acres,—an increase of 9 acres in the same period, the total acreage of the farms of the state was 26,248,498,—an increase of more than 7,580,000 acres. Of these lands, 70 per cent was improved,—a material gain for the ten years. In 1900 the total value of the

Industries.	Number.	Capital.	Workers.	Wages.	Product.
All industries (1900)	11,114	$165,832,246	77,234	$35,484,825	$262,655,881
Lumber and timber	438	52,095,923	15,140	7,140,571	43,585,161
Flouring and grist mill products	512	24,125,781	4,086	2,383,836	83,877,709
Boots and shoes	16	2,237,540	2,025	719,231	3,615,801
Car construction	39	4,933,805	4,700	2,599,387	6,319,876
Cheese, butter, and condensed milk	596	2,264,956	740	398,224	8,479,896
Foundry and machine-shop products	175	4,267,322	3,139	1,512,579	5,975,077
Slaughtering, meat packing, etc.	20	1,355,011	668	303,977	7,810,555
Liquors, malt	78	8,539,722	856	417,832	4,456,928
Oil, linseed	5	1,963,231	155	81,981	3,272,598

lands, fences, buildings, farm implements and machinery and the live-stock was $788,684,642, an increase from 1890 of $373,983,016. The estimated value of the farm products for the first-mentioned year was $161,217,304; for the latter, $71,238,230. In 1900 there were 696,469 horses; 8,339 mules; 1,871,325 neat cattle, which included 753,632 milch cows, 1,440,806 swine, and 589,878 sheep (including lambs), from which had been sheared 1,945,249 pounds of wool. The following table shows the number of acres devoted to the cereals of Minnesota; also the production (number of bushels) and value of the same:

	Area in Acres.	Production in Bushels.	Value.
All cereals	11,207,026	242,852,807	$90,000,000
Indian Corn	1,441,580	47,256,920	11,337,105
Wheat	6,560,707	95,278,660	50,601,948
Oats	2,201,325	74,054,150	15,829,804
Barley	877,845	24,314,240	7,220,739
Rye	118,869	1,866,150	783,852
Buckwheat	6,700	82,687	43,741

Much attention is given to dairy-farming, the census reports showing that the increase in the number of milch cows from 1890 to 1900 was 159,724, or more than 45 per cent. Minnesota was one of the few states producing 100 gallons or upward of milk per capita of population. The report of the dairy commissioner for 1895 showed 253 creameries in the state and near 100 cheese factories. More than 50,000 dairy farmers furnish milk or cream to the creameries, and the industry is growing constantly and proving to be one of the most profitable in agriculture. All branches of farming are being extended, modern methods coming into general use, and the results are increased areas and production in all parts of the state. The crop of wheat for the year 1902 was estimated at 100,000,000 bushels,—an increase of almost 5,000,000 over that of 1900. Almost 3,000,000 acres of meadow land are annually mown for hay, the various kinds producing 4,411,667 tons in 1899. Nearly 10,000 bushels of clover-seed were produced and more than 500,000 bushels of other grass-seed. In the production of flax Minnesota stood second in acreage, first in production of seed, eighth in the production of fiber, and first in the total value of the product. The increase in the production of flaxseed from 1890 to 1900 was twenty-sevenfold. In 1900 more than two-thirds of the flax crop of the United States was produced in the region tributary to St. Paul, Minneapolis and Duluth, and the utilization of the flax fiber for the manufacture of tow, twine cordage, bagging, paper and linen had become an industry of prominence and importance.

The statistics of manufactures, as reported in the twelfth decennial census, showed that Minnesota had made the greatest advance in the relative rank, both according to gross value and according to net value of products, having advanced from thirty-sixth place in gross value and thirty-fifth place in net value of products in 1850 to the thirteenth and fourteenth places, respectively, in 1900. The state also showed the greatest advance in the number of employees and the amount paid for wages. The above table shows some of the leading lines of manufacture, together with information in regard thereto.

In addition to the above, the various clothing manufactories had invested about $2,600,000, employed nearly 6,000 persons, to whom were paid about $2,000,000, and finished products turned out to the approximate value of $7,000,000. Printing and publishing products were turned out to the value of almost $6,000,000 and liquors to two-thirds this amount. The manufacturing interests of Minnesota are enhanced greatly by the fine water-power in almost all parts of the state. The power at Minneapolis (q.v., in Vol. XVI, p. 497) is very considerable, and is utilized to a great extent.

The area of Minnesota is, as already stated, 83,365 square miles, of which 4,160 is water and 79,205 square miles land. Within the state are numerous lakes, estimated at as many as 10,000 in number, ranging in size from 340 square miles (Red Lake) down to ponds of a few acres.

One of the most considerable sources of wealth to the people of Minnesota has been the lumber industry. Originally about five-eighths, or more than 50,000 square miles, of the state were covered with a heavy growth of timber. In the northern part of the state the principal varieties of timber were the white and yellow pine, white cedar, spruce, tamarack and birch. In the south were large growths of oak, elm, bass and maple. The facilities for transportation by water were so abundant that early in the history of the state the lumber industry took a high rank, and from 1870 to 1880 the annual returns from the business were not far from $10,000,000.

From 1880 to 1890 the industry yielded an annual return of from ten to fifteen millions, and in 1893 the business had reached the amount of $17,898,780. Forest fires have destroyed thousands of acres of the most valuable timber-lands of the state, and the prodigality with which the timber has been sacrificed has combined with the destruction by fire to reduce the product to at least one half of what it might otherwise have been.

The minerals of Minnesota are many and of inexhaustible quantity. The geological reports made in 1900 on the production of iron ores showed that Minnesota had passed New York and Pennsylvania in production, and occupied the first rank among the iron-producing states, the output the year previous to the report having been 10,225,465 long tons, or almost 8 per cent of the total for the United States (see IRON AND STEEL, in these Supplements). Gold has been found in the north part of the state, in the region of Rainy Lake and the Lake of the Woods. There were in operation, in Minnesota, in 1900, 80 stone-quarries, which yielded a return of very nearly a million dollars. The granite-quarries yielded about one third of this amount, limestone following with a little over one half and sandstone making up the remainder.

The fisheries of the state are not fully reported, but the estimates place the number of persons engaged in lake and inland fishery at about one thousand and the value of the annual catch at two hundred thousand dollars.

The state banks of Minnesota numbered 188 in Oct., 1900,—an increase of 27 within the two years preceding. At the same date there were 86 national banks, and 47 private banks, making in all 338 banking institutions within the state. There were also 14 savings associations and 9 loan and trust companies, and 15 national and 57 local building and loan associations were in operation at the date of the report of the banks, the financial recapitulation of all of the above institutions making (in 1895) the following showing:

	Capital Stock Paid in.	Surplus.	Undivided Profits.	Aggregates.
State banks	$9,098,300.00	$945,849.30	$1,729,197.14	$11,773,346.44
National banks	15,545,000.00	2,612,434.27	2,017,598.48	20,175,032.75
*State savings banks	9,943,407.41	61,600.00	78,553.48	10,083,560.89
Private banks	4,043,713.00	554,462.00	149,590.00	4,747,765.00
Loan and trust companies	3,778,867.83	681,610.99	624,932.81	5,085,411.63
National building and loan associations	7,639,500.97		806,312.26	8,445,813.23
Local building and loan associations	3,715,089.83		404,996.88	4,120,086.71
Local building and loan associations in outside cities	1,063,722.71		39,651.41	1,103,374.12
Totals	$54,827,601.75	$4,855,956.56	$5,850,832.46	$65,534,390.77

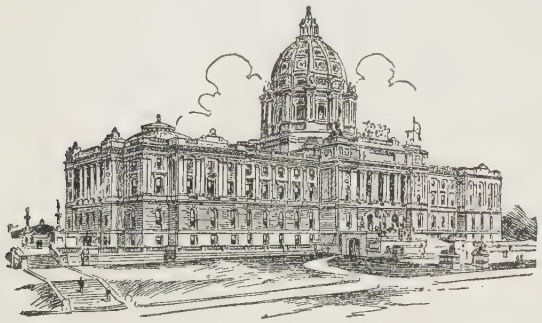
The railroads of the state had a combined mileage, in 1900, of almost 7,023 miles, which had cost for construction and equipment over $233,000,000. The state tax of three per cent on the gross earnings amounted, for several years prior to 1896, to a little more than a million dollars annually, and is the only tax levied against the railroads of Minnesota, regardless of valuations. Almost all of the roads radiate from Minneapolis and St. Paul, making these cities important centers. The rivers of the state afford navigation for almost three thousand miles, and Lake Superior gives an outlet to the products of the state to all parts of the world.

The superintendent of public instruction made the following report for the year 1899: Persons in the state between the school ages of 5 and 21 years, 530,700; number of pupils enrolled, 384,063; number of pupils attending the public schools not entitled to the apportionment, 67,393, making the total enrollment 451,456. The number of teachers employed was, male, 2,931; female, 8,634; the wages of the former averaging $39.38 per month and of the latter $32.66. During the year there were held 17 state institutes, at which 1,035 teachers were enrolled, and 46 teachers' training schools, attended by 5,947 teachers. There were 88 high schools under the supervision of the state high school board, attended by 17,539 pupils. The school districts of the state numbered 6,111, and 273 new schoolhouses were erected during the year. The value of all schoolhouses and sites within the state was $12,227,134, and the value of school apparatus and libraries exceeded $600,000. State normal schools are maintained at Winona, Mankato, St. Cloud and Moorehead, at which some 1,850 pupils were enrolled in 1895. In the text-book libraries of these four schools are more than 20,000 volumes. The state university (q.v., in these Supplements) had, in 1894, 1,828 students, the total number of graduates up to that time being 1,097. The current school fund for the year mentioned was $5,516,413, and the amount paid for teachers' salaries amounted to $3,445,700. For teachers' institutes and training schools there was expended the sum of $27,000; for the support of state high schools, $38,000; the normal schools at Winona, Mankato and St. Cloud each received the sum of $24,000, the one at Moorehead $16,000, and for the state university the different appropriations aggregated almost $100,000. The permanent school fund of Minnesota amounts to $10,712,120. Many of the schools of the state exhibited their work at the World's Columbian Exposition, and numerous awards were received.

Of the denominational institutions of learning in Minnesota, Augsburg Seminary at Minneapolis,

*Including deposits.

St. Olaf College at Northfield, and Gustavus Adolphus College at St. Peter are all under Lutheran control. Hamline University at Hamline and St. Paul's College at St. Paul Park are both controlled by the Methodist Episcopal Church. The Roman Catholic Church has St.



STATE CAPITOL BUILDING, ST. PAUL.

John's University at Collegeville, the Christian Church has the Northwestern Christian College at Excelsior, the Congregational Church has Carleton College at Northfield and the Free Baptist Church has Parker College at Winnebago City.

Minnesota had, in 1890, 3,429 church organizations, 2,619 edifices, and a total membership of 532,590, which constituted 40.91 per cent of the population, and church property of the value of $12,940,152. There were represented 39 denominations, the principal ones being the Baptists, all bodies, 229; the Adventists, 85; Roman Catholics, 465; Congregationalists, 175; Evangelical Association, 134; German Evangelical Synod, 53; all Lutherans, 1,141; all Methodists, 591, all Presbyterians, 185; Protestant Episcopal, 171; and United Brethren, 35.

Jan. 1, 1899, there were 665 newspapers of all kinds published in Minnesota. Papers were published in all of the 82 counties of the state, in 308 cities, towns, and villages, and in 80 of the county seats. Of the whole number of papers, 35 were daily, 3 semiweekly, 555 weekly, 1 fortnightly, 12 semimonthly, 58 monthly, and 1 bimonthly.

The assessed valuation of all personal property in the state in 1899 was $75,947,498, and of the real estate $513,956,153, making a total of $585,083,328. The total taxes levied amounted to $14,645,741. The report of the state treasurer for the fiscal year ending July 31, 1900, showed the receipts for the year to have been $6,903,296, the balance carried over from the preceding year, $2,067,116, making the total receipts from all sources, including balances and transfers, $9,015,168. The total expenditures were $6,845,830, leaving a balance in the treasury of $2,169,337. On July 31, 1900, the total debt of the state was $1,279,000, having been reduced $70,000 in the year, and $380,000 since January 1, 1897.

The state institutions of Minnesota have cost for buildings, up to and including 1894, the sum of $6,072,577, the total amount expended for their support from organization up to the same time having been $12,570,586. The following is a statement of the total cost of the buildings of each institution, the amount expended for maintenance in 1894, and the total amount expended for support:

	Buildings.	Maintenance, 1894.	Total Expended for Maintenance.
State prison	$717,210	$105,446	$1,535,230
Reform school	300,243	45,214	806,337
State reformatory	186,952	49,976	238,532
Insane hospitals	1,824,932	477,587	4,945,669
University	766,055	223,687	1,873,416
Normal schools	498,037	95,386	1,153,449
Deaf, dumb, blind and imbecile	582,174	133,816	1,474,904
State public school	161,242	27,558	182,289
Soldiers' orphans			110,102
Minnesota Soldiers' Home	224,195	63,620	250,717
Rebuilding capitol	420,230		
New capitol	242,305		
StateAgricultur'l Soc.	150,000		

In 1895 the National Guard of Minnesota consisted of one brigade, which was made up of three regiments of infantry and one battalion of artillery. The infantry is divided into 26 companies, and the artillery into 2 batteries of 2 guns each. The comparative strength of the guard was 1,977 officers and men. The annual expenses incurred by the state for the maintenance of the militia amount to an average of $20,000.

The following table gives the principal cities of Minnesota, and shows their comparative growth during the ten years from 1890 to 1900. The population in 1880 is also given for comparison.

	1900.	1890.	1880.
Minneapolis	202,718	164,738	46,887
St. Paul	163,065	133,156	41,473
Duluth	52,969	33,115	838
Winona	19,714	18,208	10,208
Stillwater	12,318	11,260	9,005
Mankato	10,599	8,838	5,550
St. Cloud	8,663	7,686	2,462
Red Wing	7,525	6,294	5,876
Faribault	7,868	6,520	5,415
Brainerd	7,524	5,703	1,865
Rochester	6,843	5,321	5,103
Little Falls	5,774	2,354	508
Austin	5,474	3,901	2,305

In addition to the above, there are 5 cities with a population in excess of 4,000, 6 with a population in excess of 3,000, 8 with a population in excess of 2,000, and 9 with a population in excess of 1,000.

State flower of Minnesota, Moccasin.

The following is a list of the governors of Minnesota since the date of the admission of the state to the Union in 1857, together with their respective terms of service:

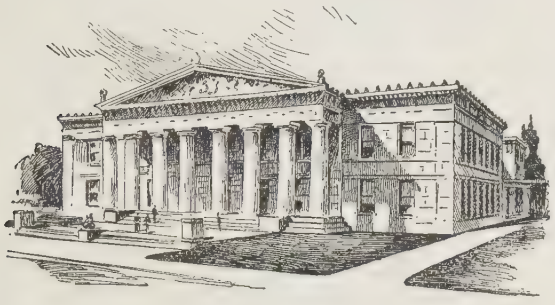
Henry S. Sibley	1857-58	Cushman K. Davis	1873-75
Alexander Ramsey	1858-63	John S. Pillsbury	1875-81
Stephen Miller	1863-65	Lucius F. Hubbard	1881-86
William R. Marshall	1865-69	Andrew R. McGill	1886-88
Horace Austin	1869-73	William R. Merriam	1888-93

Knute Nelson 1893–95	Samuel R. Van Sant.....1901–05
D. M. Clough.....1895–99	John A. Johnson .....1905 —
John Lind 1899–1901	

See also MINNESOTA, Vol. XVI, pp. 497–500.

MINNESOTA, UNIVERSITY OF, a co-educational institution for higher education, located at Minneapolis; maintained and controlled by the state of Minnesota; founded in 1851 by territorial statute, and confirmed by the state constitution adopted in 1857. The school really was started under the charter of 1868, and opened in 1869.

The institution is under the control of a board of regents, consisting of nine members, appointed by the governor of the state for six years, and



LIBRARY, UNIVERSITY OF MINNESOTA.

three members *ex officio*,—the governor of the state, the superintendent of public instruction, and the president of the university. The endowment of the school originally consisted of 202,083 acres of land given by the Federal government, to be used or sold; the productive funds amounted in 1904 to $1,375,000, which, supplemented by annual legislative appropriation, gave in 1904 an income of $582,629. There are faculties of science, literature and the arts; agriculture; engineering, metallurgy and the mechanical arts; law; medicine, dentistry, and pharmacy. The geological survey of the state has been intrusted to the university since 1872, and through the state high school board the high schools are being affiliated with the university. In 1904 the library contained 110,000 volumes, the student body numbered 3,900, and there were 290 instructors. All departments are co-educational, and no honorary degrees are given.

MINNESOTA RIVER. See MINNESOTA, Vol. XVI, p. 498.

MINNEWAUKON OR DEVIL'S LAKE. See DAKOTA, Vol. VI, p. 681.

MINONK, a city of Woodford County, northern central Illinois, 30 miles N. of Bloomington, on the Atchison, Topeka and Sante Fé and the Illinois Central railroads. Mining and agriculture are the principal occupations, and the city has a steam-mill, eight elevators, brickyards, tile-works and coal-mines. Pop. 1890, 2,316; 1900, 2,545.

MINORCA. See BALEARIC ISLANDS, Vol. III, p. 240.

MINORITES. See FRANCISCANS, Vol. IX, p. 615.

MINOTAUR, a mythological monster. See MINOS, Vol. XVI, p. 500.

MINOT'S LEDGE, a part of Cohasset Rocks, a reef of Norfolk County, 15 miles E.S.E. of Boston, in lat. 42° 16′ N., long 70° 46′ W. On it stands a granite lighthouse with a light showing 15 miles.

MINT, UNITED STATES. In the United States there are five mints—in Philadelphia (since 1793), New Orleans (1835), San Francisco (1854), Carson City and Denver—all under the charge of the Bureau of the Mint of the United States Treasury Department, and presided over by the Director of the Mint. Only the first three are in active operation, the other two are really assay-offices, and at Philadelphia alone all the authorized coins are struck. There the dies for all the mints are made. All dated or obverse dies must be destroyed at the close of each year But individuals may get medals struck off for the cost of doing it. Besides the mints there are a number of assay-offices, established in Charlotte, North Carolina, 1835; New York, 1853; Boise City, Idado, 1869; Helena, Montana, 1874; and St. Louis, 1881. The duty of these is to receive deposits of gold and silver, melt them down into bars, stamp these with their weight and proportions of the metals, and return to the depositor. The Bureau of the Mint has charge of all the mints and assay-offices, and in turn is under the Treasury Department. The head officer is the Director of the Mint. From 1891, when the gold coined was valued at $24,172,203, the amount rose until 1894, when there was $79,546,600 worth of coin. This decreased in 1895 to $43,933,475, but rose to $76,028,485 in 1897. Silver, which was coined in dollars to the amount of $38,272,020 in 1891, the year after the passage of the Sherman Act, was coined less and less until 1895, when only $3,956,011 worth was coined; in 1897 the amount (including fractional coins) was $18,487,297. There was also subsidiary coin to the amount of $1,166,936 in 1891, and $5,113,470 (including $2,511,058.25 World's Fair coins) in 1893. The total amount of copper, nickel, and bronze coined from the founding of the mint to the end of 1897, was $29,722,781.33. See also Vol. XVI, pp. 503–514; and COINS OF THE UNITED STATES, Vol. XXVI, pp. 224–226.

MINTO, WILLIAM, a Scottish author and editor; born in Aberdeenshire Oct. 10, 1845. He graduated with honors at Aberdeen University in 1865, and spent a year at Oxford. He acted for some years as assistant to Professor Bain of Aberdeen, and wrote two biographical and critical books, *Manual of English Prose Literature* and *Characteristics of the English Poets;* became editor of the now extinct *Examiner* in 1874; was next on the leader-writing staff of the *Daily News* and the *Pall Mall Gazette.* He was appointed professor of logic and English in the University of Aberdeen in 1880; wrote *Defoe* in John Morley's English Men of Letters Series (1879); and contributed to the *Nineteenth Century*, the *Fortnightly Review* and *Macmillan's Magazine.* He contributed many biographical sketches (see Index) to this ENCYCLOPÆDIA, of which the more notable are CHAUCER, DICKENS, FIELDING, MILL J. S., SPENSER, and WORDSWORTH; and also wrote *Logic, Inductive and Deductive* (1893); and *Literature of the Georgian*

Era (1895), posthumously published. He died at Aberdeen, March 1, 1893.

MINTO, Earl of, Gilbert J. M. K. Elliot, G. C. M. G., since 1898 governor-general of Canada, was born July 9, 1845, and succeeded to the Earldom of Minto in 1891. He was educated at Eton and Trinity College, Cambridge, and entered the British army as ensign in the Scots Guards in 1867. He served in the Afghan war in 1879 and was subsequently private secretary to Lord Roberts at the Cape. From 1883 to 1885 he was military secretary to Lord Lansdowne, when Governor-General of Canada, and was chief-of-staff in the Canadian Northwest Rebellion of 1885. When in Canada he was known as Viscount Melgund. In the autumn of 1898 he succeeded Lord Aberdeen as Governor-General of Canada, when he was created a K. C. M. G. and later a G. C. M. G.

MINUIT, or MINNEWIT, Peter, an American colonist; born in Wesel, Prussia, about 1580. In 1625 he was appointed governor of Massachusetts; bought Manhattan Island from the Indians and built Fort Amsterdam in 1526. He died near Wilmington, Del., in 1641. W.M.C.

MIOCENE PERIOD. See Geology, Vol. X, pp. 321–323.

MIOLAN-CARVALHO, Marie Caroline, a French vocalist; born in Marseilles, Dec. 31, 1827. She received her musical education in Paris under Duprez, and after finishing at the Conservatoire made a tour of France with her instructor. On her return she made her *début* in *Lucia di Lammermoor*. In 1853 Mlle. Miolan married Carvalho, director of the Théâtre Lyrique, where she at once became prima donna. In 1859 she went to London, singing there until 1868, when she was secured to sing at the Paris Opera House, where she continued to sing, as well as at the Opera Comique, until her retirement. She was the original Marguerite in Gounod's *Faust*.

MIQUEL, Johannes von, statesman; born in Frankfort-on-the-Main, Germany, Feb. 21, 1829; was forced to leave home in 1848, owing to the prominent part he took in the revolution of that year. Later he was pardoned for his offences, and returning to Germany, was appointed official prosecutor for Göttingen. He was elected to the North German Reichstag in 1867, and in his first speech before that body won great distinction. He remained a leader of the National Liberals in the Reichstag till 1874. A few years later he retired from politics. In 1887 he re-entered political life; in 1890 became Prussian minister of finance, and filled this office with brilliancy until May, 1901. He died Sept. 8, 1901. G.J.H.

MIQUELON ISLAND. See St. Pierre and Miquelon, Vol. XXI, p. 206.

MIRACLE PLAYS, MYSTERIES and MORALITIES. See Drama, Vol. VII, pp. 357–359.

MIRACLES. See Apologetics, Vol. II, p. 167.

MIRAGE. See Light, Vol. XIV, p. 604; and Fata Morgana, in these Supplements.

MIRAMICHI RIVER. See New Brunswick, Vol. XVII, p. 382.

MIRANDA, Christine Nilsson, Countess, a Swedish operatic singer; born in Hassaby, near Wexio, Sweden, Aug. 3, 1843. As a child she sang at rural fairs and later was educated for the operatic stage by Berwald at Stockholm and Masse and Wartel in Paris. In 1864 she made her first appearance as Violetta in *La Traviata* at the Theatre Lyrique, Paris; and she appeared in 1867 in that rôle in London. She sang for the first time in the United States in concert in 1870 and in opera in 1871. She made several subsequent tours to America, making her farewell appearance in New York, April 16, 1883. Among her most famous impersonations are Ophelia in Thomas's *Hamlet*, and Margaret in Gounod's *Faust;* Elvira in *Don Giovanni* and Elsa in *Lohengrin*. In 1872 she married M. Auguste Rouzaud, who died in 1882; and in 1886 she married Count A. de Miranda, a Spanish nobleman. Since 1888 she has lived in retirement. W.M.C.

CHRISTINE NILSSON.

MIRIAM, sister of Moses, and eldest of the family. She is mentioned first as watching her brother's cradle. After the crossing of the Red Sea she becomes "Miriam the Prophetess"; takes the lead, with Aaron, in the complaint against Moses for his marriage with a Cushite, and for this was stricken with leprosy. This curse was removed, and she died toward the close of the wandering, being buried at Kadish.

MISERERE, the name by which, in Catholic usage, the Fiftieth Psalm of the Vulgate (51st in authorized version) is commonly known. It is one of the so-called "Penitential Psalms." The *Miserere* is of frequent occurrence in the services of the Roman Church, and is sung on each of the three evenings of Holy Week, different music being used on each occasion. The psalm is commonly supposed to have been written by David when rebuked by the prophet Nathan, but sometimes is attributed to Manasseh. For the architectural use of the term, see Architecture, Vol. II, p. 411.

MISHAWAKA, a city of St. Joseph County, Indiana, in the center of the "northern tier" of the state. It lies in an agricultural and manufacturing region, a few miles south of the Michigan state line, and six miles east of the city of South Bend. It has extensive works for the making of vehicles, agricultural implements, lumber and woodenware, and many other articles. It is reached by the Chicago and Grand Trunk and the Lake Shore and Michigan Southern railroads, and had in 1900 a population of 5,560. W.J.F.

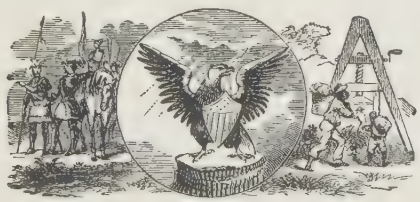
MISIONES or MISSIONES, Argentina, a territory forming the northeasternmost portion of the

Republic, projecting from the state of Corrientes between Brazil and Paraguay, and bounded north, east, and south respectively by the Paraná, the Iguassú, and the Uruguay rivers. It has an area of 20,833 square miles; a central range of hills extends from the southwest to the northeast and ramifying spurs are interspersed by broad valleys and fertile plains. The region is well forested, yielding in abundance the products of its zone (see ARGENTINA) and agriculture, especially stock-raising, is increasing, good grazing and pasture-land contributing to its development. Minerals abound in the hills, and copper-mining, an ancient industry, is again being exploited. The capital, Posadas, on the east bank of the Paraná River, is opposite Encarnacion, Paraguay, whence a railroad extends northwest to Asuncion, and southward follows the course of the Uruguay, connecting with Buenos Ayres, and Montevideo in Uruguay. Population, 1900, 35,521. C. L. S.

MISREPRESENTATION. See FRAUD, Vol. IX, p. 639; and DECEIT and FALSE PRETENSES, in these Supplements.

MISSION INDIANS, the tribes of American Indians which were gathered around the Californian mission houses. These missions were first established by Charles III of Spain, in 1767, and the Jesuits undertook to civilize and Christianize the Indians in California. Junípero Serra was the prime mover and heart of the enterprise, and the good results were due largely to him. The origin of the Indians of the country is not known, but they were of a more docile nature than the neighboring tribes, and took naturally to agriculture and peaceful pursuits. The present Mission Indians are composed mostly of branches of the Shoshone and Yuman stock of Indians, and live in southern California.

MISSISSIPPI has an area of 46,810 square miles, of which 470 are water surface, and 46,340, or 29,657,600 acres, are land surface. In 1890 the population was 1,289,600,—in 1900 (12th census), the population was 1,551,270. The rank among the states in 1880 was eighteenth; that of 1890, twenty-first; the density of population at the first-mentioned date being 24.42 to the square mile; in 1900, it was 33.5. In 1900, 41,094 citizens of the state resided in the three cities, the per cent of urban population being but 2.64 of the whole, the smallest, in this respect, of that of any state in the Union. The division among the sexes in 1900 was 781,451 males and 769,819 females; the percentage of native-born population was 99.5, and the number of negroes 907,630,—an increase since 1890 of 165,071.



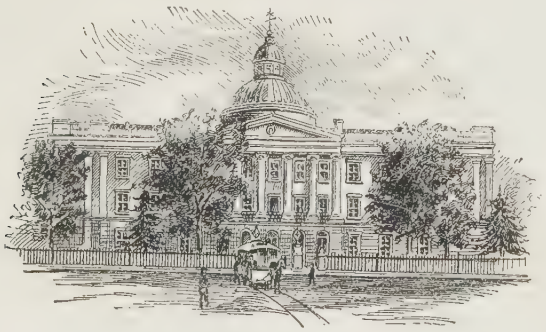
SEAL OF THE STATE OF MISSISSIPPI.

Agriculture has received a great stimulus in the time intervening since 1890, prior to which time cotton was the chief staple and engaged the attention of fully three-fourths of the agriculturists of the state. Up to the date mentioned scarcely enough of the staple products was raised for home-consumption, and it became apparent that this specialization of agriculture must be done away with, and efforts made to diversify it by growing other crops to which the soil and climate were equally well suited. In 1900, Mississippi had advanced in this direction to a point where 2,372,065 acres were devoted to the cereals, and 39,691,275 bushels produced. Of this area, 95.9 per cent was devoted to corn; 3.7 per cent to oats; and 0.4 per cent to wheat, rice, rye and barley. The crop of corn for 1889 was 26,148,144 bushels, which had increased in 1899 to 38,789,920 bushels. Wheat-raising is receiving much attention at the hands of farmers, and in many sections of the state the crop can be harvested early in June, allowing a crop of corn to mature in time to plant the same land again in wheat in November. The twelfth (1900) census reports gave the number of farms in Mississippi at 220,803,—an increase from 144,318 in 1890. The total acreage was 18,240,736,—an increase of 668,189 acres for the ten years, and the percentage of improved lands had risen from thirty-nine per cent to almost forty-two per cent in the same time. The estimated value of all lands, fences, buildings, implements, machinery and live-stock had risen from $167,328,457 in 1890 to $204,221,027 in 1900. The number of horses in the state at the latter date was 229,311; mules and asses, 216,032; neat cattle, 873,356 (which included 299,318 milch cows); swine, 1,290,498; and sheep, 236,470, from which were sheared 779,310 pounds of wool. Notwithstanding the advances made in branches of agriculture other than cotton-raising, Mississippi did not fall off in the production of cotton in 1899, the year from which the census figures were gathered. In 1889 the acreage was 2,883,278, which had increased in 1899 to 2,897,920,—a gain of 14,642 acres, the production also having increased from 1,154,725 bales to 1,313,798 bales,—a gain of 159,073 bales. From 1869 to 1889 it increased rapidly, and although only a slightly increased acreage was shown for 1899, the production showed a gain of 16.8 per cent for the last decade. Every county in the state but one produces more or less cotton, the exception being Jackson County, in the extreme southeastern portion, bordering on the Gulf of Mexico. The total value of the crop of cotton of 1899 was, in round numbers, $47,340,314 to the producers.

Other products of the soil are grasses and forage plants of all kinds, while the yield of hay per acre is greater than that of Illinois, Iowa or Kansas, and considerably in excess of the average yield for the United States. Oats, rye and barley are becoming more extensively grown, and make the best of winter grazing. Rice is an important grain crop in the southern part of the state, where the yield is from twenty to thirty bushels per acre. Sorghum is grown largely in the northern part of the state, and thousands of barrels are shipped annually to the mar-

kets of the North. In the central and southern portions, sugar-cane is grown on almost every farm, the yield being from 300 to 400 gallons per acre, often realizing as much as $200 per acre to the farmer. Hemp is receiving much attention, and a factory for working it has been erected near Greenville. Irish potatoes do well, and sweet potatoes, especially the yellow yam, give large returns. Cattle-raising is a profitable industry, and the mild climate and winter grasses combine to give the stockmen a great advantage over those engaged in the same business in more northerly sections of the country. Creameries have been established in many parts of the state, and have proved to be paying investments. Sheep subsist wholly on grass the entire year, and the cost of producing wool is accordingly reduced far below that known to the Northern sheep-raiser. All kinds of small fruits and vegetables, as well as orchard products, grow prolifically, and shipments to the Northern markets have proved one of the most profitable industries. Shipments of tomatoes were made from Mississippi to Chicago as early as 1866, and by a gradual growth the business has become one of immense proportions. Apples, pears, peaches, plums, grapes, strawberries, tomatoes, early potatoes, cucumbers and many other similar products are now shipped to many Northern cities, and realize handsome profits to the growers. The railroads have established fast trains and equipped them with refrigerator-cars, thus placing the shipments in distant places in short time and good order.

In 1900, Mississippi had 4,772 specified manufacturing industries, in which capital to the amount of $35,807,419 was invested, 27,987 persons were employed, whose annual wages aggregated $8,638,906, and from which came finished products to the value of $40,431,386. The leading industries were lumber and other mill products, which, with other forms of lumber and timber, approximated $17,000,000. Cotton goods amounted to $1,472,835, flouring and grist mill products amounted to $932,816, cars and general shop construction reached a total of $1,326,401, and oil, cottonseed and cake yielded a return of $6,681,121.



STATE CAPITOL BUILDING, JACKSON, MISSISSIPPI.

The soil is, for the most part, exceedingly fertile, except for a sandy section in the south east. A dense natural forest growth covers most of the state, the species including oak, poplar, hickory, black walnut, sugar maple, cottonwood, lime, sassafras, gum, beech, buckeye, dogwood, persimmon, tulip, and pawpaw. Along the Gulf the magnolia is luxuriant. In the south, generally, mature pine is abundant, furnishing invaluable naval stores. The swamps supply species of cypress, useful for domestic purposes.

The fisheries of the state afford a large revenue, oysters leading, with an annual yield of about one million bushels, of the value of about $150,000. Along the gulf coast, the bays, rivers and bayous are stocked with many varieties of fresh and salt-water fish, the canning of which has become a large industry, shipments being made to all parts of this country, as well as to European points. Crabs abound the year around, and furnish a cheap and wholesome food.

Oct. 31, 1900, the 101 state banks of Mississippi reported resources and capital to the amount of $19,345,841, and individual deposits aggregating $12,547,103. The loans and discounts amounted to $6,056,435.

In 1900 there were 2,952 miles of railroad within the state, on which the several lines paid a privilege tax of $37,244. In addition to this, the state tax, assessed on a valuation of $24,204,469, amounted to $221,028. In 1900 there were 125 miles of new road built, and the roads of the state were in a flourishing condition generally. The numerous waterways of Mississippi add largely to the facilities for transportation. The Mississippi and Pearl rivers form the western boundary, and from the former there are a large number of branches which intersect the delta region so completely that in that section of the state there are few plantations which are not within the reach of a navigable stream. During a portion of the year the Pearl River is navigable as far north as Jackson, and boats from Mobile ascend the Tombigbee as far as Columbus. Hundreds of vessels are engaged in the carrying-trade along the gulf coast, and Biloxi is fast becoming an important shipping-point, having one of the best natural harbors on the coast.

From a school census taken in 1897 it was ascertained that the number of children within the school age of 5 to 21 in the state was 31,300; number enrolled in the public schools, 67,579; daily average attendance, 223,900; number of public schools, 6,510; number of teachers employed, 7,903; value of school property, $1,636,055; total revenue for the public schools, $1,214,630; amount expended for the public schools for the year, $1,165,840; amount expended for state educational institutions, $126,826; total amount expended by the state for educational purposes (1901), $1,983,639. Within the ten years (1885–95) there was an increase in the number of children enrolled, of 69,572,—an increase in the daily attendance of 18,864; in the number of schools taught, of 615; in the average length of the school year, of 29 days; in the number of teachers, of 1,003; in the number of schoolhouses built, of 2,396; in the amount of annual expenditures for school purposes, of $474,025. The enumeration revealed the fact that there were 100,000 more negro children than white. In addition to the public schools, there were 480 private schools, attended by 21,203 pupils. Other educational institutions to which the state

gives financial aid are the University of Mississippi (q.v., in these Supplements), the Agricultural and Mechanical College, Industrial Institute and College, Holly Springs State Normal College (for negro youths). The Methodist Episcopal Church maintains two institutions,—one at Holly Springs, known as Rust University, and the other at Jackson, known as Millsaps College. The Baptist Church has Mississippi College, at Clinton. A non-sectarian institution known as the Cooper-Huddleston College is operated at Daleville. Alcorn Agricultural and Mechanical College, also for negro youth.

Among the state charitable, educational and correctional institutions are the State Lunatic Asylum, at Jackson, costing the state $95,000 for 1895, and having had, for the year, an average of 707 patients; the East Mississippi Insane Asylum, at Meridian, costing the state about $21,000 per annum, and having had, for the year 1894, an average of 245 patients; the Deaf and Dumb Institute, at Jackson, costing for maintenance $22,829 in 1895; the Institute for the Blind, costing near $10,000 in 1895; the Vicksburg Hospital and the Natchez Hospital, the aggregate cost of maintenance being close to $15,000.

At the beginning of 1900, reports were made relative to the finances of the state, showing that the assessed valuation of the real estate amounted to $131,315,821, the personal property $57,400,338, and the railways and telegraph lines of the state $27,020,320, making a total assessable valuation of $215,765,947. The receipts from all sources for the year ending Sept. 30, 1900, were $1,924,074, and the expenditures for the same period were $1,635,438, leaving a balance of $622,402. The total indebtedness of the state was $2,881,354, a portion of which was never to become payable, the interest only becoming due. After deducting these sums from the gross indebtedness there is left but $261,908 actually due and payable.

In 1895 the church statistics of Mississippi were as follows:

Denominations.	Organizations.	Buildings.	Members.	Value of Buildings.
Presbyterian	228	204	12,430	$426,290
Baptist	1,611	2,619	222,680	1,408,732
Episcopalians	68	63	3,560	322,960
Methodist	1,855	1,866	163,169	1,644,869
Universalist	3	3	120	800
Congregational	35	34	1,551	12,375
Jewish	6	6	1,370	64,000
Roman Catholic	67	67	11,348	321,525
All others	114	112	5,812	55,672
Total	3,987	4,974	422,040	$4,257,223

On Jan. 1, 1899, there were 217 newspapers of all kinds published in Mississippi. Papers were published in 74 of the 75 counties, in 124 cities, towns, and villages, and in 75 of the county seats. Of the entire number of papers, 15 were daily, 4 semiweekly, 179 weekly, 1 fortnightly, 5 semimonthly, and 13 monthly.

By the terms of the constitution adopted in 1890, the lease system of dealing with the labor of state convicts was abolished, to take effect on and after Jan. 1, 1895. The commission of five appointed in 1894 made purchases of land for the purpose of forming state farms to be worked by the convicts under state supervision; 3,207 acres were purchased in Rankin County, 2,725 in Hinds County, and 2,005 acres in Holmes County, making, in all, 7,237 acres, for which $64,638 were paid. The total number of convicts on hand Sept. 30, 1895, was 990. The value of the farm products for 1895 amounted to $155,000; the expenses of producing the same aggregated $95,000. The total expenditures of the institution for the fiscal year ending Sept. 30, 1895, were $213,355.

The National Guard of Mississippi aggregated, in 1895, 1,735 officers and men. The force is formed into a brigade, consisting of three regiments, and a cadet battalion of infantry, a battalion of cavalry and a battalion of artillery, attached to an infantry regiment. The state appropriation for 1895 was $3,600; the Federal appropriation for the preceding year, $7,763.

The following are the principal cities of the state, with their population according to the census of 1900: Vicksburg, 14,834; Meridian, 14,050; Natchez, 12,210; Greenville, 7,642; Jackson, 7,816; Columbus, 6,484; Aberdeen, 3,434; Yazoo, City, 4,944; Biloxi, 5,467; Wesson, 3,279.

Feb. 5, 1890, the legislature passed an act, by the terms of which the governor was to issue a proclamation and call an election for the purpose of choosing delegates to a constitutional convention. The proclamation was issued, directing the election to be held July 29th, and 14 delegates at large and 120 by districts were elected, and assembled August 12th, continued in session 72 days, adjourning November 1st. The principal features of the new constitution were the following:

1. The government was divided into three departments—executive, legislative and judicial.

2. The legislature should meet biennially, alternating regularly with special sessions, the latter to be held for the purpose of considering appropriation and revenue bills only, except in cases of emergency to be decided by the governor.

3. Senators and representatives were to be elected for four years.

4. The governor should thereafter be elected for four years, and be ineligible to become his own immediate successor. He should have the right of vetoing appropriation bills.

5. The office of lieutenant-governor was abolished, and the president of the senate was to become the successor of the governor in the event of a vacancy. The speaker of the house of representatives was to come next in succession.

6. Separate schools for children of the white and colored races were to be maintained.

7. Marriages contracted between white persons and negroes (or mulattoes) were to be void.

8. Married women were given the same rights in the management of their own property as possessed by a *feme sole*.

9. The right of suffrage was extended to "every male inhabitant of the state, (except idiots, insane persons and Indians not taxed), who is a citizen of the United States, 21 years old and upward, who has resided in the state two years and one year in the election district, or in the incorporated city or town, in which he offers to vote, and who is duly registered, * * * * * * * and who has never been convicted of bribery, burglary, theft, arson, obtaining money or goods under false pretenses, perjury, forgery, embezzlement or bigamy, and who has paid, on or before

the first day of February of the year in which he shall offer to vote, all taxes which may have been legally required of him, and which he has had an opportunity of paying according to law, for the preceding year, and who is not delinquent for any taxes of the year next preceding, and who shall produce to the officers holding the election satisfactory evidence that he has paid said taxes. On and after the first day of January, 1892, the following qualifications are added to the foregoing: Every qualified elector shall be able to read any section of the constitution of the state, or he shall be able to understand the same when read to him, or give a reasonable interpretation thereof."

As no general election of the principal state officers was provided for until November, 1895, an ordinance was passed extending until Jan. 1, 1896, the terms of office of the governor, lieutenant-governor, secretary, treasurer, auditor, attorney-general and superintendent of education. The constitution was promulgated as that of the state of Mississippi on and after Jan. 1, 1891, without submitting it to the people.

State flower, Magnolia.

The following is a list of the governors of Mississippi from 1817, the date of admission of the state into the Union:

David Holmes.....1817–19	John J. Pettus.....1860–62
George Poindexter.....1819–21	Jacob Thompson.....1862–64
Walter Leake.....1821–25	Charles Clarke.....1864–65
Gerard C. Brandon.....1825	William L. Sharkey.....1865
David Holmes.....1825–27	Benjamin G. Humphreys.1865–68
Gerard C. Brandon.....1827–31	Adelbert Ames.....1868–70
Abram M. Scott.....1831–33	James L. Acorn.....1870
Fountain Winston.....1833–34	R. C. Powers.....1870–74
Hiram G. Runnels.....1834–36	Adelbert Ames.....1874–76
Charles Lynch.....1836–38	John M. Stone.....1876–82
Alexander G. McNutt.....1838–42	Robert Lowry.....1882–90
Tilgham M. Tucker.....1842–44	John M. Stone.....1890–96
Albert G. Brown.....1844–48	A. J. McLaurin.....1896–1900
Joseph W. Mathews.....1848–50	A. H. Longino.....1900–04
John A. Quitman.....1850–51	James K. Vardaman.....1904 —
John Isaac Guion.....1851	
James Whitfield.....1851–52	
Henry S. Foote.....1852–54	
John J. MacRae.....1854–57	
William McWillie.....1857–60	

See also MISSISSIPPI, Vol. XVI, p. 544.

Revised by R. C. A. *and* A. R. R.

MISSISSIPPI, UNIVERSITY OF, an institution of higher learning, located in Lafayette County, Mississippi. It was chartered in 1844, but was not opened till 1848. The endowment up to 1894 consisted of the proceeds from the sale of a township of land given to the state by Congress. The state pays six per cent interest on this, and the income in 1901 was $46,243, including all charges from tuition, etc. In 1894, Congress granted another township of land. There are 12 university buildings and a library containing 18,000 volumes. The instruction is open to both men and women, three courses of study being offered to them: arts, science, and philosophy. In 1904 there were 254 students and 22 instructors.

MISSISSIPPI SCHEME. See FRANCE, Vol. IX, p. 515.

MISSOULA, a city, and important lumber and ranching center, and the capital of Missoula County, northwestern Montana, 95 miles N.W. of Butte, on the Missoula River, and on the Northern Pacific railroad. Population 1890, 3,426; 1900, 4,366.

MISSOURI, according to the latest corrected surveys, has an area of 69,415 square miles, of which 680 square miles are water surface. The area is almost twenty thousand square miles greater than that of the state of New York, greater than all of the New England states, with Delaware added, and almost exactly the same as that of the state of Washington. The population in 1890 was 2,679,184; by the 12th census (1900) it was 3,106,665. Of the inhabitants of the state, 1,084,014 lived in the thirty-five cities, constituting 34.9 per cent of the entire population. The males numbered 1,595,710; the females, 1,510,955. The number of people to the square mile was 45.2; the percentage of native-born citizens was 93.0; of foreign-born, 7.0; the number of negroes, 161,234,— an increase of 11,050 since 1890. Missouri retained the same relative rank among the states, in the matter of population, at the time of the twelfth decennial census that was held at the time of the eleventh,— that of fifth.

SEAL OF THE STATE OF MISSOURI.

The state stands high in the production of the cereals, as will be shown by the following deductions from the twelfth (1900) census:

Acres devoted to the cereals	10,421,755
Production of the cereals, in bushels	253,733,775
Value of cereals	$78,574,841
Acres devoted to corn	7,423,683
Bushels of corn produced	208,844,870
Acres devoted to wheat	2,056,219
Bushels of wheat produced	23,072,768
Acres devoted to oats	916,178
Bushels of oats produced	20,545,350
Acres devoted to rye	21,233
Bushels of rye produced	220,338
Acres devoted to buckwheat	2,715
Bushels of buckwheat produced	21,480
Acres devoted to barley	1,727
Bushels of barley produced	28,969
Total value of principal farm crops	$121,455,026

The total area in hay and forage for 1899 was 3,481,506 acres, or 21.3 per cent greater than ten years before. The rank in the production of flax was sixth; in the production of hemp, fourth. In tobacco the rank was sixth, the number of acres under cultivation being 4,361, from which 3,041,996 pounds were raised. The number of farms was 284,886; the number in 1890 having been 238,043; the average size, 119 acres, and the total farm area, 33,997,873. The total value of the lands, fences, buildings, implements, machinery and live-stock was $1,033,121,897,—a gain for the ten years of $246,731,644. The number of horses was 967,037; of mules, 292,296,— giving the state the rank of first in that connection; neat cattle, 2,978,589, including 765,386 milch cows; lambs, 423,510; sheep, 663,703, from which 4,145,137 pounds of wool were shorn. The state stood third in the total number of swine, having 4,524,664, and first in the number slaughtered by farmers for their own use, 1,093,711. The total

value of all farm products for the year was estimated at $219,296,970. Agriculture is constantly receiving more intelligent attention from the farmers of Missouri, and organizations for the dissemination of agricultural knowledge are maintained throughout the state. In 1894 there were Farmers' Institutes held in 86 of the counties of the state, to which the farmers in attendance gave an extended interest. The state is divided into 15 districts, for each of which the governor appoints an official, who, together with the governor, the superintendent of public schools and the dean of the agricultural college, constitutes the state board of agriculture. Stock-breeders' associations also are maintained, and the proceedings of all associations are published and distributed to the farmers of the state. Horticulture is receiving much attention, as the state is well situated for this branch of agricultural industry. Missouri stands third in the production of grapes and wine, while apples, peaches, pears, plums, cherries and other small fruits flourish as nowhere else in the great Mississippi valley.

Reports made by the United States Department of Agriculture for 1900 show the following in regard to the principal crops of Missouri: Corn, 7,423,683 acres; 208,844,870 bushels; value, $61,246,305. Wheat, 2,056,219 acres; 23,072,768 bushels; value, $13,520,012. Oats, 916,178 acres; 20,545,350 bushels; value, $4,669,185. Hay, 3,481,506 acres; 4,326,896 tons; value, $20,467,501. Including with the above rye and potatoes, of which latter 7,786,623 bushes were produced, the total value of farm products of the year amounted to $102,762,890.

The specified manufacturing industries of Missouri at the time of the 12th (1900) decennial census amounted in number to 18,754; the capital invested was $249,888,581; the number of persons employed was 148,871, to whom $75,289,034 were paid as wages for the year; and the finished products amounted in value to $385,492,784. Among the leading industries reported were flouring and grist mill products, which amounted to $26,393,928; malt liquors, $13,776,905; tobacco, chewing, smoking and snuff, $25,101,446; slaughtering and meat-packing, wholesale, $42,229,127; foundry and machine shop products, $15,073,005. Clothing manufacturing, and boot and shoe trade yielded products to the value of $20,178,290. The collections of internal revenue for the state for the fiscal year ending June 30, 1895, amounted to $7,830,900 in addition to which tobacco manufacturers bought special stamps for tobacco of the value of $3,461,653. The 878 cigar manufactories of the state made 65,420,772 cigars and 1,194,800 cigarettes. Ninety-two other factories had an output of 51,948,338 pounds of plug-tobacco, 85,057 pounds of fine-cut, 5,569,077 pounds of smoking-tobacco, and 26,012 pounds of snuff. Sixty-nine distilleries were in operation during the year, and the amount of distilled spirits gauged amounted to 8,598,080 gallons.

In 1900, the production of coal was about 2,995,022 tons, of a value of nearly $3,643,975, giving employment to 8,000 people. About 2,500 tons of coke were made, almost all of which was used by the zinc-smelting works. The coal produced was from 402 mines, located in 34 of the counties of the state. Zinc to the amount of 474,560,910 pounds was produced in 1900, having been increased from 960 tons in 1873, at which date the product was of the value of $8,000, that of 1900 being $2,011,724. The total production of lead and zinc for the fiscal year ending June 30, 1900, was of a value of $7,967,335, of which amount $4,847,049 came from 47 mines reporting in the single county of Jasper. The yield of the granite-quarries for 1900 was $151,688,—a decline from $400,000 three years previous. The yield of sandstone and limestone in 1900 was approximately $1,035,060 in the aggregate; brick, tile, sewer-pipe and miscellaneous articles of clay exceeded $2,600,000. The iron industry was in a poor condition, from a decline in prices, and the mines reported in 1899 only 22,720 tons. Pig-iron also fell off, the product in 1893 being 30,000 long tons, that of 1895, but 6,000 tons.

The equalized taxable valuation of the property of the state, as a basis for taxation in 1901, was $1,093,091,246. The valuation has increased steadily since 1887, amounting, in round numbers to $231,000,000. The tax rate in 1895 was 25 cents on the $100 The total taxes received by the state in 1894 was $2,006,201 for the revenue fund and $1,031,043 for the interest fund. Jan. 1, 1901, the total debt of the state amounted to $6,280,839, which covers an indebtedness outstanding in connection with the school fund.

The school fund of Missouri amounted on the first day of January 1901, to $6,283,491. The

STATE CAPITOL BUILDING, JEFFERSON CITY.

expenditures for the preceding year had been $7,048,826, of which $4,663,209 was for teachers' salaries. The total number of persons in the state within the school age of 6 to 20 years was 981,722, of which 893,566 were white and 51,369 negroes. The state is divided into 9,424 school districts, the total number of pupils enrolled being 668,018, and the number of teachers 13,782, of whom 737 were negroes. The number of schoolhouses erected during the preceding year was reported at 269. The school libraries contained 220,510 volumes. There were enrolled in private schools, according to the report of the superintendent of the public schools, 20,073 pupils, 1,190 teachers employed, and 167,576 volumes in the several libraries. The county institutes of the state had 10,253 teachers enrolled as students during the year, the cost to the state being

$30,663; 22 institutes for negro teachers were held, 379 students attended and 358 certificates were recommended. The high schools of the state had 10,650 pupils enrolled during the school year 1894–95 and at the middle of the year 1895–96, 11,501. The state seminary funds expended for the State University in 1895 amounted to $101,502. Three state normal schools are maintained, one at Kirksville, one at Warrensburg and one at Cape Girardeau, the cost to the state being almost $25,000 each annually, the aggregate expenditures since 1871 reaching $835,000. Within the same period the state has given aid to the Lincoln Institute to the amount of $218,000, and since 1875 to the School of Mines and Metallurgy, $203,514. Other and higher institutions of learning in Missouri are many, and, without exception, flourishing. Of the educational institutions of the northwest, Missouri College at Albany, Central College at Fayette, Morrisville College at Morrisville, Scarritt Collegiate Institute at Neosho, and St. Charles College at St. Charles are under the control of the Methodist Episcopal Church South. Carthage Collegiate Institute at Carthage, Westminster College at Fulton, Presbyterian College of Upper Missouri at Lawson, and Park College at Parkville are under the control of the Presbyterian Church. Central Wesleyan College at Warrenton and Missouri Wesleyan College at Cameron are controlled by the Methodist Episcopal Church. Central Christian College at Albany and Christian University at Canton are controlled by the Christian Church. Southwest Baptist College at Bolivar, La Grange College at La Grange, and William Jewell College at Liberty are under the control of the Baptist Church. St. Vincent's College at Cape Girardeau, Christian Brothers' College at St. Louis, and St. Louis University in the same city are all conducted by the Catholic Church. The Cumberland Presbyterian Church has Ozark College at Greenfield and Missouri Valley College at Marshall. The Christian Union Church has Grand River Christian Union College at Edinburg. The Congregational Church has Drury College at Springfield. The United Presbyterian Church has Tarkio College at Tarkio; and the United Brethren Church has Avalon College at Trenton. Five non-sectarian institutions are conducted, one at Bowling Green, known as Pike College; the University of the State of Missouri, at Columbia (q.v., in these Supplements); Pritchett School Institute, at Glasgow; Western College, at La Belle, and Washington University, at St. Louis.

The number of church organizations was 8,064; the number of communicants, 735,839; the value of all church property, $19,663,737. The leading denomination in point of number of organizations was the Methodists, all bodies, 2,412; followed by the Baptists, all bodies, with 2,355; Disciples of Christ, 1,120; Presbyterians, 776; and Catholics, 441.

During the year 1895 the state penal and eleemosynary institutions were embarrassed by the lack of sufficient funds to secure their proper maintenance. The appropriations since that time have been ample to provide for all necessary expenditures. The following are the principal charitable, educational and penal institutions, their location, and cost of maintenance for the years 1893 and 1894:

School for the Blind, St. Louis, $59,297.
Lunatic Asylum No. 1, Fulton, $182,017.
Lunatic Asylum No. 2, St. Joseph, $203,255.
Lunatic Asylum No. 3, Nevada, $153,737.
St. Louis Insane Asylum, St. Louis, $84,166.
Missouri Penitentiary, Jefferson City, $90,160.
Reform School for Boys, Boonville, $69,490.
Industrial Home for Girls, Chillicothe, $14,960.
School for the Deaf and Dumb, Fulton, $118,996.

In addition to the liberal maintenance afforded the poor and unfortunate in the above charitable institutions, there was the sum of $573,610 expended in 1895 for the support of those persons who were not inmates of the same, but who were maintained at the expense of the several counties of the state.

Including main lines and branches, there were, in Missouri, June 30, 1900, 143 railroads, controlled and operated by 50 companies. The report of the railroad commissioners gives the following facts: Mileage of main line, 6,962.36, increase within the preceding year, 52.91 miles; second, third, and fourth tracks, main line, 103.70 miles, increase 25.46 miles; sidings, 1,511.38 miles, increase 51.39 miles. In 1852 there were but five miles of railroad in the state. The year of the greatest amount of construction was 1871, when 580 miles of track were laid. The increase in mileage since 1875, the year in which the railroad commission was established, has been 3,514 miles, or an average of 184.9 miles per year.

The state banks numbered 510 on Oct. 31, 1900; their combined capital was $18,500,000; resources, $113,800,000; deposits, $80,000,000. There were 94 private banks, with a reported capital in excess of $1,000,000; resources $8,000,000; and deposits, $6,000,000. There were, also, 67 national banks, with combined capital of about $18,000,000. The aggregate banking capital of all institutions was $46,500,000; the deposits amounted to $197,900,000, and the total loans and discounts, $162,000,000.

The National Guard of Missouri consisted, in 1895, of one brigade, composed of 4 regiments of infantry and 2 batteries, aggregating 2,134 men. The legislative appropriations for the support of the military averages about $20,000 annually. Brigade and regimental encampments are usually held annually, and the guard is in a high state of efficiency.

The principal cities of the state, with their population in both 1890 and 1900 are given herewith:

	1890.	1900.
St. Louis	451,770	575,238
Kansas City	132,716	163,752
St. Joseph	52,324	102,979
Springfield	21,850	23,267
Sedalia	14,068	15,231
Hannibal	12,857	12,780
Moberly	8,215	8,012
Carthage	7,981	9,416
Joplin	9,943	26,023
Independence	6,380	6,974
St. Charles	6,161	7,982
Chillicothe	5,717	6,905
Jefferson City	6,742	9,664
Nevada	7,262	7,467

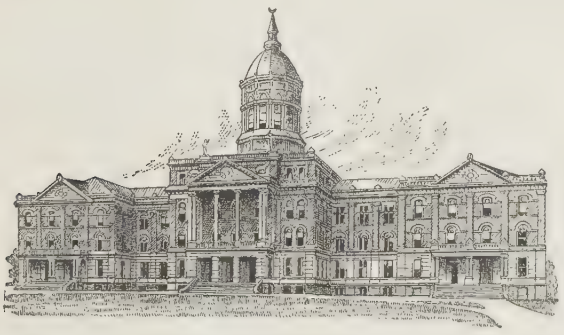
Jan. 1, 1899, 1,037 newspapers of all kinds were published in Missouri. Papers were published in 112 of the 114 counties, in 432 cities, towns, and villages, and in 112 county seats. Of the whole number of papers, 82 were daily, 2 triweekly, 10 semiweekly, 802 weekly, 2 fortnightly, 16 semimonthly, 109 monthly, 3 bimonthly, and 11 quarterly.

The following is a list of the governors of Missouri since 1821, the date of the admission of the state into the Union, together with their respective terms of office:

Alexander McNair	1820–24	Joseph W. McClurg	1869–71
Frederick Bates	1824–25	B. Gratz Brown	1871–73
Abraham J. Williams	1825	Silas Woodson	1873–75
John Miller	1825–32	Charles H. Hardin	1875–77
Daniel Dunklin	1832–36	John S. Phelps	1877–81
Lilburn W. Boggs	1836–40	T. T. Crittenden	1881–85
Thomas Reynolds	1840–44	J. S. Marmaduke	1885–87
M. M. Marmaduke	1844	A. G. Morehouse	1887–89
John C. Edwards	1844–48	D. R. Francis	1889–93
Austin A. King	1848–52	W. J. Stone	1893–97
Sterling Price	1852–56	L. V. Stephens	1897–1901
Trusten Polk	1856–57	A. M. Dockery	1901–05
Hancock Jackson	1857	Joseph W. Folk	1905 —
Robert M. Stewart	1857–61		
Claiborn F. Jackson	1861		
Hamilton R. Gamble	1861–64		
Willard P. Hall	1864–65		
Thomas C. Fletcher	1865–69		

See also MISSOURI, Vol. XVI, pp. 547–551.

MISSOURI, UNIVERSITY OF, a non-sectarian institution of learning established at Columbia, Missouri, in 1840. The endowment, amounting to $1,235,819, is held by the state, which pays interest on the amount and makes further appropriations when necessary. In 1898 the total income was $202,000. There are six departments: 1. Normal School; 2. College of Agriculture and Mechanic Arts; 3. School of Mines and Metallurgy, located at Rolla; 4. School of Law; 5. School of Medicine; 6. Engineering Department. The state experiment station was added in 1887. The campus, with its buildings and the farm, is valued at $1,000,000. In 1904 there were 1,649 students of both sexes, and 119 instructors; and the library had 70,000 volumes.



UNIVERSITY OF MISSOURI.

MISSOURI COMPROMISE. See UNITED STATES, Vol. XXIII, pp. 798, 809.

MISSOURI RIVER. See MISSISSIPPI, Vol. XVI, pp. 542, 543.

MISSOURI VALLEY, a town and a railroad junction of Harrison County, central western Iowa, 21 miles N. of Council Bluffs, on Willow River and on the Chicago and North-Western and the Sioux City and Pacific railroads. It has railroad machine-shops employing four hundred men, stock-yards besides a carriage factory, a stove foundry, flour mills and brick and tile works. The town is furnished with electric lights and a good water-supply, and has large fair grounds. Population 1890, 2,797; 1900, 4,010.

MISTAKE IN LAW. It is a general rule of law that when one does an act through a mistake as to his legal rights, he will not, for that reason, be relieved from the consequences of his act. It would be otherwise if the person benefited by the mistake knew that the first person was proceeding under a mistake of law and permitted him to continue under the mistaken belief. The ground of relief in such case, however, would be fraud rather than the mistake. An act done under a mutual mistake of fact will avoid the consequences of the act. The same rule will apply when one party has suppressed the truth, while the other acted under a mistaken belief as to the fact. But to entitle one to relief because of mistake of fact, the mistake must be concerning some material fact which was, in part at least, the cause of the act. If a mistake as to some fact in a contract is on the part of only one of the parties thereto, as a general rule no relief can be afforded if the acts of the other party were free from fraud. Courts of equity alone have jurisdiction to grant relief from the consequences of an act done through mistake; but if a mistake is so obvious from an inspection of a contract without extrinsic evidence as to leave no doubt of the intention of the parties, a court of law may construe the contract so as to correct the mistake. The rules as to mistake of law and of fact are similar to those applying in case of ignorance of law or fact. See also IGNORANTIA JURIS, and IGNORANTIA FACTI, in these Supplements.

MISTASSINI, LAKE, Canada, in the Province of Quebec, 280 miles N. of Quebec City, is about 100 miles long from S.W. to N.E., with a maximum width of 12 miles; an eastern extension is called Mistassinis or Little Mistassini Lake; the outlet is through Rupert River. C.L.S.

MISTRAL. See METEOROLOGY, Vol. XVI, p. 154.

MISTRAL, FRÉDÉRIC, a Provençal poet, son of a peasant, was born Sept. 8, 1830, at Maillane, department of Bouches-du-Rhône; educated at Nyons and Avignon, and was licensed to practice law; at Foix, in 1854, he, Roumanille, the printer Aubanel and six others, founded a society for the restoration of the Provençal language to literary use, which is now known as the Félibrige. (See FÉLIBRES, in these Supplements.) He was then known for his fugitive pieces in that dialect, but in 1859 he published *Mirèio* (*Mireille*), a metric epic of Midi life, that awakened the Provençal heart, and won a medal valued at $400 from the French Academy in 1861. It was turned into a libretto for an opera by Gounod, and exists in a French rendering by Mistral himself, and an English translation by Harriet W. Preston (1872). Mistral also obtained the Halphen prize in 1884 from the French Academy, and a prize of $2,000 from the Academy of Inscriptions and Fine Arts in 1890. He was decorated with the Legion of Honor cross in 1863. Other works of his are *Cal-*

endeau (1867); *Les Îles d'Or* (1875); *Nerto*, a novel (1884), and *La Reine Jeanne*, a tragedy (1890); and of these works he made both French and Provençal versions. He made a Provençal-French dictionary (*Lou Tresor dou Felibrige*), embracing several Languedoc dialects. He was also a contributor to *Revue Félibriennes*.

MITCHELL, John, an Irish patriot and journalist; born in Dungiven, County Derry, Ireland, Nov. 3, 1815, the son of a Presbyterian clergyman. He was graduated from Trinity College, Dublin, studied law and began practice at Banbridge. In 1842, after the formation of the Young Ireland party, and the publication of the *Nation*, Mitchell began to contribute to its columns, and after the death of Thomas Davis, in 1845, he became assistant editor. His writings becoming too violent, he was asked to resign. Three years later he started the *United Irishman*, and for his articles in that journal he was tried on a charge of treason-felony and sentenced to 14 years' transportation. He was sent to Bermuda and thence to Van Dieman's Land, whence he made his escape to the United States in the summer of 1853. In New York he published his *Jail Journal, or Five Years in British Prisons* (1854). He also published the *Life of Hugh O'Neill, Prince of Ulster* (1865); and the *History of Ireland from the Treaty of Limerick* (1868). In 1874 he returned to Ireland, and was elected to Parliament for Tipperary, but was declared ineligible. He died in Cork, Ireland, March 28, 1875. W.M.C.

MITCHEL, Ormsby McKnight, an American soldier and astronomer; born in Union County, Ky., Aug. 28, 1810. At twelve years of age he was employed as a clerk in a store in Miami, Ohio, but later received a cadet's appointment to West Point. On graduating in 1829 he was made acting assistant professor of mathematics. From 1832 to 1834 he practised law at Cincinnati; from 1834 to 1844 was professor of mathematics, philosophy, and astronomy at Cincinnati College; and in 1836 and 1837 was chief engineer of the Little Miami Railroad. In 1845 he organized an observatory at Cincinnati, and was its first director. In 1859 he became director of the Dudley Observatory at Albany, N. Y., at the same time retaining his connection with the institution at Cincinnati. He introduced many improvements in the recording of observations, and made important discoveries and calculations. He was the author of *The Orbs of Heaven; or Planetary and Stellar Worlds;* a treatise on algebra; *Popular Astronomy; Astronomy of the Bible; Elementary Treatise on the Sun*, etc. On the outbreak of the Civil war in 1861 he was commissioned brigadier-general in the Federal army, and conducted campaigns in Tennessee, Alabama, Georgia, etc. He fought and won the battle of Huntsville, Ala., in April, 1862, was promoted major-general, and appointed commander of the Department of the South. He died in Beaufort, S. C., Oct. 30, 1862. E.E.T.

MITCHELL, a post village of Lawrence County, central southern Indiana, 62 miles N.W. of New Albany, on the Baltimore and Ohio Southwestern and the Louisville, New Albany and Chicago railroads. It has saw and stave mills, lime-kilns, stone-quarries and a cigar factory. It is the seat of the Southern Indiana Normal College. Population 1890, 1,583; 1900, 1,772.

MITCHELL, a city, railroad junction and the capital of Davison County, southeastern South Dakota, 42 miles W. of Sioux Falls, on the Chicago, Milwaukee and St. Paul and the Chicago, St. Paul, Minneapolis and Omaha railroads. It has manufactories of chemicals and well-boring machinery, a creamery, a planing-mill, a broom factory and a brickyard, and ships much grain and live-stock. It is the seat of South Dakota (Methodist) University, a co-educational school, founded in 1885, which in 1896 had 14 instructors, 200 students, and a library of 4,000 volumes. The Chicago, Milwaukee and St. Paul railroad has repair-shops here. Population 1890, 2,217; 1900, 4,055.

MITCHELL, Donald Grant, an American author; better known under the pseudonym of "Ik Marvel"; born in Norwich, Connecticut, April 12, 1822. He was graduated from Yale in 1841 and in 1844 went to Europe where he traveled for three years. Upon his return he published *Fresh Gleanings, or a New Sheaf from the Old Fields of Continental Europe* (1847). In 1850 appeared *The Battle Summer*, a volume of sketches reminiscent of the outbreak in Paris in 1848, and *The Lorgnette, or Studies of the Town*, a series of satirical papers. The next year he wrote *A Bachelor's Reveries* and *Dream Life*. In 1853 he was appointed United States consul at Venice. On his return, in 1855, he purchased a farm in the outskirts of New Haven, Connecticut, which he named "Edgewood." In 1876 he was one of the judges of Industrial Art at the Centennial Exhibition in Philadelphia. In 1878 he was one of the United States Commissioners to the Paris Exhibition. His works on various themes include *Fudge's Doings* (1855); *My Farm of Edgewood* (1863); *Wet Days at Edgewood* (1865); *Rural Studies, with Hints for Country Places* (1867); *Dr. Johns* (1866); *Seven Stories with Basement and Attic* (1864); *Out-of-Town Places* (1884); *English Lands, Letters and Kings* (1889); *American Lands and Letters* (1897). His most popular work, *A Bachelor's Reveries*, appeared in later editions under the title, *The Reveries of a Bachelor*. This work has been translated into French and German, and has had an enormous sale. W.M.C.

DONALD G. MITCHELL.

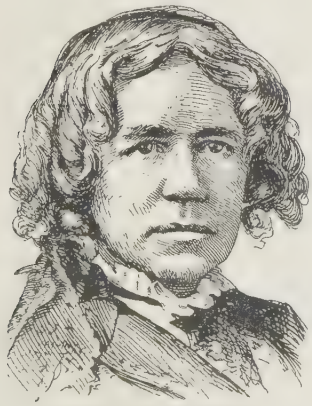
MITCHELL, Hinckley Gilbert, an American clergyman and educator; born in Lee, N. Y., February, 22, 1846. He graduated at Wesleyan University, Conn., in 1873, and at the school

of theology of Boston University in 1876. He joined the Central New York Conference of the Methodist Episcopal Church in 1879; was pastor at Fayette, N. Y., 1879–80; tutor in Latin and Hebrew at Wesleyan University, 1880–83; and professor of Hebrew and Old Testament exegesis at Boston University, 1883–1903. E.E.T.

MITCHELL, John Kearsley, an American physician; born in Shepherdstown, Va., May 12, 1796. He was educated in Scotland; studied medicine, and was graduated at the University of Pennsylvania in 1819. He was a ship's surgeon for three years, and settled in Philadelphia in 1822. In 1824 he lectured on the institutes of medicine and physiology in the Philadelphia Medical Institute; in 1824 accepted the chair of chemistry in the same school; and in 1833 was appointed lecturer in the Franklin Institute on chemistry applied to the arts. In 1841 he was called to the chair of theory and practice of medicine in Jefferson Medical College. He published, among other works, a treatise on the *Cryptogamous Origin of Malarious and Epidemical Fevers* (1849). He died in Philadelphia, April 4, 1858. E.E.T.

MITCHELL, Margaret, Julia (Maggie), an American actress, was born in New York City, about 1832, and made her first appearance, when a child, on the stage of the old Bowery Theater. She became prominent as a soubrette during 1852, and afterward acquired a national reputation as an actress in *Fanchon*, of which she was the original. She also played with success in *Little Barefoot*, *The Pearl of Savoy*, and other dramas adapted to the requirements of her particular school.

MITCHELL, Maria, an American astronomer; born in Nantucket, Mass., Aug. 1, 1818.



MARIA MITCHELL.

At an early age she attended a school in Nantucket, taught by her father, who was himself devoted to astronomy and had built a small observatory in which he conducted observations for the United States Coast Survey. This school she left at the age of 16, and after a year at another private school she began to assist her father in his observatory work, becoming also librarian of the Nantucket Athenæum at a salary of $60 for the first year, $75 for the second, and $100 a year for each of the following eighteen years. A natural love for mathematics gave zest to her astronomical work, and she had a recognized status as an astronomer before she was 30 years of age. In 1847 she discovered a telescopic comet, for which she was awarded a gold medal by the king of Denmark. In 1857 she visited Europe and was well received by men of science, including Sir George Airy, Sir John Hirschel, Urbain Leverrier, François Arago and Alexander von Humboldt. Her family removed to Lynn, Mass., in 1861, and she earned about $500 a year by making computations. From 1865 to 1888 she was professor of astronomy at Vassar College. In 1873 she again visited Europe, including the observatory at Pultowa. She died in Lynn, Mass., June 28, 1889. E.E.T.

MITCHELL, Silas Weir, an American physician and author; born in Philadelphia, Feb. 15, 1830. He was educated at the University of Pennsylvania, but did not graduate, owing to illness. He graduated at Jefferson Medical College in 1850, and established practice in Philadelphia, where he became prominent as a physiologist and neurologist. He is the author of treatises on *Neurology*, *Serpent Poisons*, *Comparative Physiology*, *Injuries to Nerves*, etc., besides many pamphlets and medical essays. In another field he has written *Hephzibah Guinnes; In War Time; Roland Blake; Far in the Forest; Characteristics; When All the Woods Are Green; Hugh Wynne; Free Quaker; Adventures of François; The Autobiography of a Quack; Dr. North and His Friends; The Wager, and Other Poems;* and a collected edition of his *Poems* (five volumes in one). He has been honored with the degree of Doctor of Laws by Harvard, Edinburgh, and Princeton universities. E.E.T.

MITCHILL, Samuel Latham, an American physician and public man; born in North Hempstead, N. Y., August 20, 1764. He graduated in medicine at Edinburgh in 1786, and, returning to America the next year, took up the study of law under Chief Justice Yates, of New York. In 1788 he was a commissioner for treating with the Iroquois for the purchase of land; in 1790 he represented Queens County in the State legislature; and in 1792 he was appointed professor of chemistry, natural history, and philosophy, in Columbia College, where he first introduced the system of nomenclature invented by Lavoisier. In 1793–94, with Chancellor Livingston and Simeon De Witt, he founded the Society for the Promotion of Agriculture, Manufactures, and the Useful Arts, and in its interests, in 1796, made a geological and mineralogical tour along the banks of the Hudson. He was editor of the *Quarterly Medical Repository*, 1797–1813; represented New York in the State legislature, 1798, and in Congress, 1801–04 and 1810–13. From 1804 to 1809 he sat in the Senate. From 1808 to 1820 he was professor of natural history in the College of Physicians and Surgeons; from 1820 to 1826, professor of botany and materia medica; and in the latter year became vice-president of the Rutgers Medical School. He died in New York, September 7, 1831. E.E.T.

MITFORD, William, an English historian; born in London, February 10, 1744. He studied at Queen's College, Oxford, and in 1769 became a captain in the South Hampshire Militia of which Gibbon was then major. By Gibbon's advice he was induced to undertake his *History of Greece*. He also wrote an *Essay on the Harmony of Language; A Treatise on the Military Force*, and

Observations on Christianity. He sat in Parliament from 1783 to 1818, and died in Exbury, England, February 8, 1827. W.M.C.

MITO, Lord, also the name of a town. See Japan, Vol. XIII, p. 597.

MITOSIS or KARYOKINESIS. See Protozoa, Vol. XIX, p. 854.

MITRAILLEUR. See Gunmaking, Vol. XI, p. 253.

MITRE, Bartolome, a South American soldier and historian; born in Buenos Ayres, June 25, 1821. He took part in the siege of Montevideo and was minister of war under Obligado. He was president of the Argentine Republic for six years. He wrote *Historia de Belgrano* (1869) and other works. He died in January, 1894. W.M.C.

MIVART, Saint George Jackson, an English naturalist; born in London, November 30, 1827. He was educated at Harrow, King's College, London, and Saint Mary's College, Oscott, a Roman Catholic establishment. He was called to the bar in 1851, but chiefly occupied himself with teaching and writing about science. He became lecturer on zoölogy and comparative anatomy and professor of biology at University College, Kensington, and was secretary to the Linnean Society and vice-president of the Zoölogical Society. His researches were chiefly published in the journals of the learned societies, the reviews, and the magazines; but he also published the following well-known volumes: *The Genesis of Species* (1871); *Lessons in Elementary Anatomy* (1872); *Man and Apes* (1873); *Contemporary Evolution* (1876); *Lessons from Nature as Manifested in Mind and Matter* (1876); *The Cat*, an introduction to the study of back-boned animals (1881), and *Nature and Thought* (1883). His little *Philosophical Catechism* appeared in 1884, and his later works included *On Truth; A Systematic Inquiry; The Origin of Human Reason* (1880); *Monograph of the Canidæ* (1890); *Birds: The Elements of Ornithology* (1892); *Essays and Criticisms* (1892); *Types of Animal Life* (1893), and an *Introduction to the Elements of Science* (1894). He died in London, April 1, 1900. He wrote the articles Ape, Reptiles, Skeleton, and Viper, for this Encyclopædia. W.M.C.

ST. GEORGE MIVART.

MNEVIS. See *Religion*, under Egypt, Vol. VII, p. 620.

MOA. See Dinornis, Vol. VII, p. 212.

MOABITES. See Moab, Vol. XVI, pp. 557–559.

MOABITE STONE or MESHA STELE. See Inscriptions, Vol. XIII, p. 122; and Semitic Languages, Vol. XXI, p. 676.

MOAWIYA. See *The Omayyads*, under Mohammedanism, Vol. XVI, pp. 588–590.

MOBERLY, a city of Randolph County, north-central Missouri, 63 miles W.S.W. of Hannibal, on the Wabash and the Missouri, Kansas and Texas railroads. The Wabash railroad has machine-shops and division headquarters here. Flour, lumber, agricultural tools and ice are manufactured, and there are foundries, machine-shops and vitrified pressed-brick works. Coal is abundant in the vicinity. Farm produce, live-stock, wool, hides and hardwood lumber are shipped extensively. Population, 1890, 8,215; 1900, 8,012.

MOBERLY, George, an English author and educator; born in St. Petersburg, Russia, of English parentage, about 1803. He was educated at Oxford, was head master of Winchester School from 1835 to 1866, and in 1869 became bishop of Salisbury. His writings were mostly theological, and included *Introduction to Logic* (1838), and *The Law of the Love of God* (1864). He died July 6, 1885.

MOBILE, the chief commercial city of Alabama, the county seat of Mobile County, at the southwestern corner of the state, and one of the principal ports on the Gulf of Mexico. It lies at the head of Mobile Bay, a land-locked sheet of water, thirty miles long and fifteen miles wide, and is thirty miles from the gateway from the bay into the gulf. It is also at the mouths of the Mobile and Tensas rivers, which are the lower reaches of the Tombigbee and Alabama rivers, and it is reached by the Louisville and Nashville, the Mobile and Birmingham, and the Mobile and Ohio railroads. These rivers and railroads bring to it vast quantities of produce from many parts of the country, and its harbor facilitates their shipment to other ports. There are steamship lines plying between Mobile and New York, Liverpool and the fruit ports of Central America. The commerce of Mobile was destroyed during the Civil War, but since then it has been restored and is steadily increasing, while manufacturing industries are also being developed. The chief exports are lumber, tobacco and cotton. The prospective construction of the Panama canal will add greatly to the importance of Mobile, as of other gulf ports, as a shipping point for the Pacific trade. The city is a well-built one, with many attractive residence streets, and its situation at the head of the spacious bay gives it a pleasant climate, even in summer. Its population was 31,076 in 1890, and 38,469 in 1900. See also Mobile, Vol. XVI, p. 563. W.F.J.

MOBILE RIVER, an important tidal stream of southwestern Alabama, forming practically the lower or tidal part of the Tombigbee River and also connecting with the Alabama River. It enters Mobile Bay. W.F.J.

MOCCASIN or WATER-MOCCASIN. See Snake, Vol. XXII, p. 210.

MOCCASIN-FLOWER, a name sometimes applied to species of *Cypripedium*, a genus of orchids. They are more commonly known as "lady-slippers," and are among the most beautiful and curious

of our wild flowers. They abound in moist or swampy places, and especially in northern bogs. The slipper-like sac, formed by one of the petals, is the most conspicuous feature. The commoner forms have yellow flowers, but the most showy (*C. spectabile* and *C. acaule*) have flowers white and spotted with purple, or entirely rose-purple.

MOCHA-STONE. See AGATE, Vol. I, p. 248.

MODE, in music. For the Greek, see MUSIC, Vol. XVII, p. 86; for ecclesiastical, see MUSIC, Vol. XVII, p. 88.

MODESTO, a town and the capital of Stanislaus County, central California, 76 miles E. of San Francisco, on the Tuolumne River, and on the Southern Pacific railroad. It is in a fruit and wool-growing region, and also ships much wheat. It has planing and flour mills, a foundry and a farm-tool factory. Population 1890, 2,402; 1900, 2,024.

MODJESKA, HELENA, a Polish-American actress; born in Cracow, October 12, 1844. Her father, Michael Opido, was a musician. Her early aspirations were toward the stage, but that career seemed impossible on account of family opposition. Finally after her marriage with Modrzejewski (abbreviated in English to Modjeska) she made her first appearance in September, 1861, in an amateur performance in the town of Bochnia, Austrian Poland. Her success was such that her husband organized a small company with which she traveled through all the towns of Galicia, and during the latter part of 1862 she was engaged at the Government Theater in Lemberg for three months. She then managed a theater of her own in Czernowice, playing prominent parts herself, and assisted by her two half-brothers and her younger sister. In 1865 she returned to Cracow, and there became the leading lady in the local theater. Her fame soon extended throughout Poland and into France and Germany. After her first husband's death she married in September, 1868, Charles Bozenta Chlapowski, and a year later settled in Warsaw, where she played the principle female parts in the standard pieces of Shakespeare, Goethe, Schiller, and Molière. Driven from Poland by professional jealousy, in 1876, she emigrated to America with her husband and tried farm life in California without pecuniary success. She accordingly determined to return to the stage, and after studying English for seven months, appeared as *Adrienne* before a San Francisco audience in August, 1877. Her success was immediate and she was soon acknowledged one of the best of modern emotional actresses. W.M.C.

HELENA MODJESKA.

MODOCS, a small tribe of Indians formerly living in northern Colorado, and known chiefly through the atrocities they perpetrated under the leadership of Captain Jack during the Modoc War of 1872 and 1873, when they murdered General Canby and Dr. Thomas, members of a peace commission sent out to treat with them. They had carried on a desultory war with settlers and the troops for many years. Finally it was decided to quell their rebellious instincts and practices, and they were sent to the Quapaw reservation, in the Indian Territory, after Captain Jack and others of the leaders of the rebellion had been hanged.

MODULE. See ARCHITECTURE, Vol. II, p. 411.

MODULUS OF ELASTICITY. See ELASTICITY, Vol. VII, pp. 698, 699.

MOEN, an island. See ZEALAND, Vol. XXIV, p. 810, note.

MOERIS, LAKE. See EGYPT, Vol. VII, p. 615.

MOGDISHU. See MAGADOXO, in these Supplements.

MOGUL. See INDIA, Vol. XII, pp. 832 et seq.; and XVI, p. 567.

MOHAVE DESERT, a basin, with little wa or vegetation, chiefly in San Bernardino County, in the southeast of California, and extending into Arizona. This tract is fruitful wherever it can be watered. Irrigation-works are now a feature in the western part of San Bernardino County. The Mohave River rises in the San Bernardino Range, and finally disappears in the Mohave Sink.

MOHAVE OR MOJAVE INDIANS are an important tribe living in southern California, whence they removed from Arizona. They are among the most intelligent and civilized of all the Indians, living in well-built houses and having some industrial arts. They number more than 2,000, and are increasing. W.F.J.

MOHAWK RIVER, a beautiful stream of New York, rising in Lewis County. It flows south to Rome, where it turns E.S.E., and flows past Utica and Schenectady and enters the Hudson a few miles above Troy. Its length is about 135 miles. After reaching Rome, it is followed through its entire course by the Erie canal.

MOHAWKS. See NEW YORK, Vol. XVII, p. 465.

MOHEGAN INDIANS. See INDIANS, Vol. XII, p. 870.

MOHL, HUGH VON, botanist; born in Stuttgart, Germany, April 5, 1805. He became professor of botany at Tübingen, corresponding member of the Academy of Sciences of Paris, and was the author of *The Anatomical and Physiological Principles of the Vegetable Cell* (1850). He died at Tübingen, April 1, 1872. G.J.H.

MOHN, HENRIK, meteorologist; born in Bergen, Norway, May 15, 1835. He was educated at Christiana and became keeper of the university observatory and director of the meteorological institute of that city. From 1876 to 1878 he was superintendent of a scientific expedition to the northern coast of Norway, and he worked out the theory of Arctic drift and currents, which Nansen utilized. He wrote on meteorology, the climate of Norway, and *The North Ocean, Its Depth, Temperature and Circulation.* G.J.H.

MOIRE. See CALENDER, Vol. IV, p. 605.

MOISTURE. See ATMOSPHERE, Vol. III, pp. 30, 31.

MOJOS OR MOXOS, a tribe of natives occupying a part of the province of Beni, in Bolivia. They are nearly white in color, and are physically and mentally superior to most of the other South American tribes. They are industrious agriculturists, and generally profess Christianity, to which they were converted by Jesuit missionaries in the seventeenth century. They are several thousand in number, and are increasing. W.F.J.

MOKANNA OR HAKIM-BEN-ALLAH. See MOKANNA, Vol. XVI, p. 630.

MOLBECH, CHRISTIAN (1783–1859), a Danish lexicographer. See SCANDINAVIAN LANGUAGES, Vol. XXI, p. 390.

MOLDAU, a river. See AUSTRIA, Vol. III, p. 101.

MOLDAVIA. See ROUMANIA, Vol. XXI, p. 20.

MOLDING OR MOULDING. See ARCHITECTURE, Vol. II, p. 411; and BUILDING, Vol. IV, pp. 423, 435, 436, 453. A process, see FOUNDING, Vol. IX, pp. 423–425; and POTTERY AND PORCELAIN, Vol. XIX, pp. 658, 663.

MOLDS. See *Mucorini*, under FUNGUS, Vol. IX, pp. 729, 730.

MOLÉ, LOUIS MATHIEU (1781–1855), a French statesman. See FRANCE, Vol. IX, p. 546.

MOLE-CRICKET. See CRICKET, Vol. VI, p. 511.

MOLESCHOTT, JACOB, a Dutch physiologist; born at Herzogenbusch, Aug. 9, 1822; studied medicine and physics at Heidelberg. From 1847–54 he was a private lecturer at Heidelberg, from which post he had to retire on account of his materialistic views, when he established a physiological laboratory. In 1856 he was called to a professorship of physiology at Zurich; in 1861 to one at Turin, and in 1879 to one at Rome, where he died May 20, 1893. His works include *Physiologie der Nahrungsmittel* (1850); *Physiologie des Stoffwechsels in Pflanzen und Tieren* (1851); *Physiologisches Skizzenbuch* (1861); *Der Kreislauf des Lebens* (1865–66); *Ein Blick ins Innere der Natur* (1882). He also founded in 1851 the publication *Untersuchungen zur Naturlehre des Menschen und der Tiere*. G.A.S.

MOLESWORTH, SIR GUILFORD LINDSEY, an English civil engineer and author; born in Millbrook, Hampshire, May 3, 1828. He was educated at the College of Civil Engineers; served an apprenticeship to civil engineering on the London and Northwestern railway, and also in mechanical engineering under Sir William Fairbairn, at Manchester. In 1852 he was chief assistant engineer on the London, Brighton and South Coast railway, which he left in order to superintend the construction of buildings and machinery in the Royal Arsenal at Woolwich during the Crimean War. In 1859 he went to the Ceylon railroad as mechanical and locomotive engineer, and was appointed director of public works in 1867, and consulting engineer to the government of India in 1871. He received decorations for his services in the Afghan and Burma wars, and retired in 1889. He wrote a *Pocket-Book of Engineering Formulæ; Imperialism in India* (1885); *Reason and Instinct in Ants* (1886), and *Silver and Gold* (1891). W.M.C.

MOLESWORTH, MRS. MARY LOUISA STEWART, a novelist and popular writer for the young. She was born, of Scotch parentage, at Rotterdam, and her childhood was passed in Manchester, Scotland and Switzerland. She began to write when very young, and her first attempts were published when she was only 16. Her first complete works were written under the pseudonym "Ennis Graham," when she was about 24. When she was about 30 she began to write for children, and was at once successful, and has since held foremost rank in this department. She contributed largely, also, to the better class of juvenile magazines. She wrote *Not Without Thorns; Cicily; Hathercourt Rectory; That Girl in Black;* and contributed children's stories to *The Child's Pictorial*, some of which afterward were published under the titles *Twelve Tiny Tales; The Abbey by the Sea;* and *The Little Old Portrait.* Later stories are *Mother Bunch; An Enchanted Garden* (1892); *Hollow Tree House, and Other Stories* (1894); and *The Laurel Walk* (1898).

MOLINE, a city of Illinois. Population 1900 17,248. See also MOLINE, Vol. XVI, p. 653.

MOLOKAI. See HAWAIIAN ISLANDS, Vol. XI, pp. 474, 475.

MOLTING. See *Moult*, under BIRDS, Vol. III, pp. 672, 673.

MOLTKE, HELLMUTH KARL BERNHARD, COUNT VON, a Prussian field-marshal-general; born at Parchim, Mecklenburg-Schwerin, Oct. 26, 1800, as the son of Friedrich von Moltke (1768–1845), a retired Prussian captain, and later a Danish lieutenant-general. Having absolved the academy of land cadets at Copenhagen, he, in 1819, became a Danish officer; entered, in 1822, as second lieutenant, the Prussian service, and studied from 1823–26 at the General War Academy of Berlin. In 1832 he was assigned to the general staff, attaining, in 1835, the rank of a captain. In the same year he went to Turkey, where he took a prominent part in the reorganization of the Turkish army effected by Mahmud II, and also in the establishing of fortifications in the Dardanelles and along the Danube. From 1838–39 he was present at the Turkish campaigns in Asia Minor. Returning home in 1839, he was, in 1840, assigned to the general staff of the fourth; in 1846, to that of the eighth army corps; in 1855, as chief of a division of the great general staff and chief of the general staff of the fourth army corps. In 1856, a major-general, he, in 1858, advanced to the rank of chief of the great general staff, and was, in 1859, created a lieutenant-general. In the Danish campaign of 1864 he was appointed chief of general staff to the united armies, operating un-

COUNT VON MOLTKE.

der Prince Friedrich Karl, and was present at the passage to Alsen. When the war closed, he took up his former position of chief of general staff. In the spring of 1866 he had prepared a complete plan for the Austrian campaign, commencing in July. As general of infantry he, in the headquarters of the king, led the operations of the Prussian forces, which ended with the victory at Königgrätz, the advance to Olmütz and Vienna, and the armistice of Nikolsburg. Peace concluded, he received a national donation. When France declared war against Prussia in 1870, Moltke was ready to lay before the king a complete plan of operations, which formed the basis of the victorious campaign. For the brilliant success achieved Moltke was, in 1870, raised to the dignity of a duke, and honored at the same time with the grand cross of the order of the Iron Cross. In 1871 he was created a field-marshal-general, and a member of the House of Lords, and received a second national donation. In 1888 he retired from active service, and was appointed president of national defence. He died April 24, 1891. He left the proud record of having been the most illustrious strategist of his time. Among his writings are *Briefe über Zustände und Begebenheiten in der Türkei* (1835–39); *Der Russisch-Türkische Feldzug von* (1828–29). After his death a complete edition of his works appeared under the title *Gesammelte Schriften und Denkwürdigkeiten* (8 vols., 1891–93). G.A.S.

MOLYBDENITE. See MINERALOGY, Vol XVI, p. 410.

MOMENT. See MECHANICS, Vol. XV, p. 690.

MOMMSEN, THEODOR, a German antiquary and historian; born at Garding, Schleswig, Nov. 30, 1817; studied from 1838–43 law and history at Kiel. From 1844–47 he traveled in Italy and France in the interest of historical researches; became in 1848 professor extraordinary of law at Leipsic, from which post he had to resign in 1850 for his participation in the revolutionary movement of 1848–49. In 1852 he became professor of Roman law at Zurich and held the same professorship at Breslau from 1854–58. In 1858 he was called to Berlin as professor of ancient history, and was from 1874–95 perpetual secretary of the Royal Academy of Sciences. In 1895 he became member of the Paris Academy, receiving in 1902 the Noble Prize for his literary work. From 1872–82 he was a member of the Prussian house of deputies. His chief work *Römische Geschichte* (5 volumes) has to be classed among the foremost productions of modern German historiography. Eminent also are his monographs on *Die Römische Chronologie bis auf Cæsar* (1858); *Geschichte des Römischen Münzwesens* (1860); *Römische Forschungen* (1864–79); *Römisches Staatsrecht* (1877–88); *Römisches Strafrecht* (1899). With Henzen he edited *Corpus Inscriptorum Latinarum* (15 vols., 1863–1902), and with Studemund *Analecta Liviana*. He was also one of the editors of *Monumenta Germaniæ Historica*. He died Nov. 1, 1904. G.A.S.

MOMMSEN, TYCHO, born at Garding, May 23, 1819, and AUGUST, born at Oldesloe, July 25, 1821, —brothers of the historian,—achieved distiction as poet and chronologist, respectively.

MOMOTIDÆ. See MOTMOT, Vol. XVII, p. 9.

MONAD. See LEIBNITZ, Vol. XIV, pp. 421–423.

MONAD ELEMENTS. See CHEMISTRY, Vol. V, pp. 409, 410.

MONADNOCK, sometimes called GRAND MONADNOCK, is a solitary mountain peak in Cheshire County, New Hampshire, in the southwestern part of the state, ten miles southeast of the city of Keene. It is 3,186 feet high and is of imposing aspect. W.F.J.

MONARCHY. See GOVERNMENT, Vol. XI, pp. 11, 12 et seq.

MONCRIEFF, SIR ALEXANDER, a Scottish military engineer; born in 1829. He was educated at the Universities of Edinburgh and Aberdeen; served in Edinburgh for some time as a civil engineer; secured a commission in the Scotch Division, Royal Artillery, in which he afterward rose to the post of colonel commandant; traveled extensively in Europe, Asia, Africa and North America. In the Crimean War he was present at the siege of Sebastopol, and during the bombardments conceived the idea of a disappearing gun-carriage, which he developed afterward, securing its adoption by the British government. This invention led to all the modern systems of gun-carriages in coast-defense. Moncrieff for eight years was engaged in the Royal Arsenal. He was made a fellow of the Royal Society, a knight commander of the Bath (1890), and chairman of the Board of Management of Oxford Military Academy.

MOND, LUDWIG, a German chemist; born in Cassel, Germany, March 6, 1839; educated in the polytechnic school of his native town, at Marburg and at Heidelberg, where he studied under Bunsen; was a technical manager in some chemical works; went to Holland in 1863 to erect some Le Blanc soda-works; in 1862 went to England, in 1864 becoming settled at the works of Messrs. Hutchinson, in Widnes, where he perfected his process of recovering sulphur from alkali waste; in 1873 established alkali works near Norwich, in which the Solvay process was introduced, and afterward devoted much time to improving the process and perfecting machinery and implements used. He took out many patents in connection with this work, and developed many improvements in other branches of technical science, especially noteworthy being his process of making chlorine by the ammonia-soda process. He became vice-president of the Royal Institution; a fellow of the Royal Society; member of the council of University College; a life member of the British Association, and a member of numerous societies; published numerous papers and delivered many lectures on scientific subjects. He became, in 1881, managing director of the Limited Liability Company of Brunn, Mond and Company. He died in August, 1903.

MONERA. See *Protozoa*, under ANIMAL KINGDOM, Vol. II, p. 45.

MONETARY STANDARDS, Conflict of. See Money, Vol. XVI, pp. 761–765.

MONGOLIA. See Asia, Vol. II, p. 600; and Mongols, Vol. XVI, p. 776.

MONGOOSE or MUNGOOS. See Ichneumon, Vol. XII, p. 665.

MONIER-WILLIAMS, Sir Monier, a British orientalist; born in Bombay, India, November 12, 1819. He was educated at King's College and at Balliol, Oxford. After holding the professorship of Sanscrit at Haileybury College for fourteen years, he was elected to the same chair at Oxford in 1860. He visited India three times, the result being the foundation of the Indian Institute at Oxford, which was opened in 1884. He was knighted in 1886. Besides many editions and translations of Sanscrit classics, he is author of *Practical Sanscrit Grammar* (1846); *English-Sanscrit Dictionary* (1851); *The Sakuntala* (1853); *Introduction to Hindustani* (1858); *Indian Epic Poetry* (1863); *Sanscrit-English Dictionary* (1872); *Indian Wisdom* (1875); *Hinduism* (1877); *Modern India and the Indians* (1878); *Religious Life and Thought in India* (1883); *The Holy Bible and the Sacred Books of the East* (1886); *Brahmanism and Hinduism* (1889); *Reminiscences of Old Haileybury College* (1894); and numerous contributions to periodical literature. He died in Cannes, France, April 11, 1899. W.M.C.

MONISM. See Evolution, Vol. VIII, pp. 660, 672.

MONITOR, a vessel. See United States Vol. XXIII, p. 817.

MONITORIDÆ. See Lizard, Vol. XIV, p. 739.

MONITORS. See Navy, in these Supplements.

MONKEY. See Ape, Vol. II, pp. 132–136.

MONKSHOOD. See Aconite, Vol. I, p. 92.

MONMOUTH, the capital of Warren County, Illinois. It is the seat of Monmouth College (United Presbyterian, founded 1856), which, in 1900, had 18 instructors, 303 students, and 15,000 volumes in its library. It manufactures agricultural implements, sewer-pipes, paving-brick, carriages, road-carts and cigars. Population 1890, 5,936; 1900, 7,460. See also Monmouth, Vol. XVI, p. 781.

MONOCHORD. See Pianoforte, Vol. XIX, pp. 73, 74.

MONOCOTYLEDONS. See Vegetable Kingdom, Vol. XXIV, p. 143.

MONODELPHIA. See Mammalia, Vol. XV, pp. 374, 386.

MONO LAKE. See California, Vol. IV, p. 618.

MONOMANIA. See Insanity, Vol. XIII, pp. 109, 110.

MONONGAHELA, a river which rises in Upshur County, West Virginia, and flows north to Pittsburg, where it unites with the Allegheny to form the Ohio. It is a very rapid stream, and affords water-power for numerous lumber-mills on its banks. Coal-mining villages are frequent along its course. Length, over one hundred and fifty miles, of which about twenty are navigable for river-boats.

MONONGAHELA CITY, a post borough of Washington County, Pennsylvania, 32 miles above Pittsburg, on the Monongahela River, and on the Pennsylvania railroad. It contains a strawboard paper-mill, planing-mills, manila-paper mill and gas-works. There are coal-mines in the vicinity, and it is one of the most important wool-shipping cities in the state. Population 1900, 5,173.

MONOPHYSITES or EUTYCHIANS. See Eutyches, Vol. VIII, p. 635; and Jacobite Church, Vol. XIII, p. 548.

MONOTREMATA. See Mammalia, Vol. XV, pp. 379, 380.

MONROE, Louisiana, a city and the parish seat of Ouachita Parish, in the central-northern part of the state. It is on the Washita River, in a region productive of cotton, lumber and bricks. It is reached by the Missouri Pacific and the "Queen and Crescent Route" railroads, and is 220 miles northwest of New Orleans. Its population in 1900 was 5,428. W.F.J.

MONROE, a city and the county seat of Monroe County, Michigan, in the southeastern corner of the southern peninsula. It is an important commercial center, having ample trade facilities on land and water, since it lies at the head of Lake Erie, at the mouth of the Raisin River, and is reached by the Flint and Pere Marquette, the Michigan Central, and two lines of the Lake Shore and Michigan Southern railroads. It is the center of an agricultural country and has considerable industries in lumber and woodenware, brick and tile, paper, etc. It lies between Toledo and Detroit, nineteen miles from the one and thirty-four miles from the other, and had in 1900 a population of 5,043. W.F.J.

MONROE, a town and the capital of Union County, southwestern North Carolina, 26 miles S.E. of Charlotte, on the Sea-board Air-Line railroad, and on a branch of the Yadkin River. It manufactures carriages, iron-work, cotton, and other articles. Pop. 1890, 1,866; 1900, 2,427.

MONROE, a city and the capital of Green County, central southern Wisconsin, 38 miles S.S.W. of Madison, on the Illinois Central and the Chicago, Milwaukee and St. Paul railroads. It is in a stock-raising and dairying region, and has a foundry, creamery, cheese factory, boiler, agricultural and wagon factories. Population 1890, 3,768; 1900, 3,927.

MONROE, Fort, a defensive work in the Department of the East, having a postal and telegraph station of the same name, and a railroad station, known as Old Point Comfort, on the Chesapeake and Ohio railroad. The fort is situated in Elizabeth City County, southeastern Virginia, on Hampton Roads, near the city of Hampton, and has daily communication by steamer with Baltimore, Washington, Norfolk and New York. It was built for the defense of Hampton Roads and Gosport navy-yard, the work on the fortifications having been begun in 1817, according to the de-

signs of General Simon Bernard, a foreign engineer of eminence. Fort Monroe is commonly and with propriety called a fortress, from the large area which it incloses, eighty acres, together with numerous detached buildings. In shape it is an irregular hexagon, two of whose sides, comprising the three channel fronts, have an armament arranged in two tiers, one in casemates, one *en barbette*; while on the other four sides the ramparts are solid, with the exception of casemates on some of the flanks. Surrounding the work there is a tidewater-ditch, eight feet deep at high water, and a scarp-wall rising to a height of 17 feet above high water. The construction of the fortifications cost the United States government $2,818,000. During the Civil War it remained in the hands of the Federal government, and was of vast importance in the various military operations undertaken upon the southern Atlantic seaboard, and after the close of the war was for two years the prison of Jefferson Davis. It has undergone numerous alterations in recent years, that it may conform to the demands of modern warfare, and as now laid out it mounts 118 guns, 18 flanking-howitzers, and 51 guns *en barbette*. There are located here an artillery school and a garrison of eight companies of artillery. Fort Monroe and neighboring points in this region are popular winter resorts.

MONROE CITY, a town of Monroe County, northeastern Missouri, 23 miles W. of Hannibal, on the Hannibal and St. Joseph and the Missouri, Kansas and Texas railroads. It is in an agricultural region, and ships some railroad ties. It has flour, saw, planing and carding mills, and hay-rake and hay-stacker factories. Population 1890, 1,830; 1900, 1,929.

MONROE DOCTRINE. In September, 1815, when the allied powers of Europe were assembled at Paris after the second overthrow of Napoleon, Alexander, Emperor of Russia; Francis, Emperor of Austria, and Frederick William, King of Prussia, formed a league, which they called "The Holy Alliance," and signed a treaty, which is of interest to us to-day because it gave them the name of "Holy Allies," and because to it have wrongfully been attributed results which sprang from the quadruple treaty signed two months later by Russia, Prussia, Austria and Great Britain,—a new alliance which bound the four powers to do four things: exclude Napoleon forever from power; maintain the government they had just set up in France; resist with all their might any attack on the army of occupation; and meet in 1818 to consult concerning their common interests, and to take such measures as should then seem to be the best fitted to serve the peace and happiness of Europe. Each pledge was faithfully kept, and in the autumn of 1818 the four powers met at Aix-la-Chapelle and reviewed the events of the past three years. In Spain matters had gone from bad to worse. For ten years past her South American colonies had been in rebellion, first against Joseph Bonaparte and then against the Cortes of Cadiz, and since the restoration of 1814 against the King. That Ferdinand, single-handed, could never reduce them to subjection was apparent; and at the conference at Aix-la-Chapelle, Russia brought the matter before the powers and asked that Wellington preside over a conference of ambassadors at Madrid, to decide what terms Spain should offer her colonies. Against this England stood out, and Spain was left to go on with the struggle in her own way.

Her way was to gather a rabble at Cadiz in the summer of 1819, call it an army and send it to America. But yellow fever broke out, and before the troops could be shipped, a conspiracy was hatched, a revolution was started, and on the 9th of March, 1820, Ferdinand was forced to re-establish the constitution of 1812 and swear to support it. As tidings of this outbreak spread over Europe, the friends of liberalism took heart, and in July, 1820, the people of Naples forced their king to proclaim the Spanish Constitution and swear to uphold it. The men of Portugal were next to awake, and in September, 1820, they deposed the regency which ruled in the name of the absent king, set up a Junta and elected a Cortes to frame a constitution. For a moment it seemed not unlikely that France might be the next nation to throw off the yoke of absolutism. But Louis cried out for another meeting of the powers, and in October, 1820, the Emperor of Austria met the Czar and the King of Prussia in the little town of Troppau, in Moravia, whence they sent forth the famous Troppau circular, and summoned the King of Naples to meet them in 1821, at Laybach. At the Laybach meeting the allies reviewed the state of affairs in Naples, and having decided to stamp out popular government, sent an Austrian army into Italy, and in 1821 re-established absolute monarchy.

When the congress at Laybach adjourned in 1821, it did so with the understanding that it should meet in 1822 and take up the affairs of Spain, which, both in the Old World and the New, were far beyond her control. The place of meeting was Vienna, but the congress soon adjourned to Verona, where, in October, 1822, the question of "restoring order," which meant "re-establishing absolute monarchy" in Spain, was long debated. At length it was decided that no joint action should be taken, but that certain changes in the Spanish constitution should be demanded, and if not granted, a French army should enter Spain. The demands were made and refused. The ambassadors of the Holy Allies then left Madrid, and on April 7, 1823, a French army crossed the frontier and occupied Madrid in May and Cadiz in August.

At that moment, Canning, then Prime Minister of Great Britain, turned to Richard Rush, who represented the United States at London, and proposed that the latter should join with England in a declaration, that, while neither power desired the colonies of Spain for herself, it was impossible to look with indifference on European intervention in their affairs, or to see them acquired by a

third power. Rush had no instructions, but promised to join in the declaration if England would first acknowledge the independence of the little republics. This she would not do, and the joint declaration was never made.

When Monroe received the letters of Rush, he seems to have been greatly puzzled how to act, so he turned to Jefferson for advice, and sent the letters of Rush to Monticello, and late in October received a reply:

"The question presented by the letters you have sent me is the most momentous which has ever been offered to my contemplation since that of independence. That made us a nation; this sets our compass, and points the course which we are to steer through the ocean of time opening on us. And never could we embark upon it under circumstances more auspicious. Our first and fundamental maxim should be, never to entangle ourselves in the broils of Europe; our second, never to suffer Europe to intermeddle with Cisatlantic affairs. America, North and South, has a set of interests distinct from those of Europe, and peculiarly her own. She should, therefore, have a system of her own, separate and apart from that of Europe."

Thus encouraged, not simply to meet an emergency, but to "point the course which we are to steer through the ocean of time opening on us," Monroe consulted his secretaries, and, with their approval, announced the new policy of his country, in his annual message to Congress on Dec. 2, 1823. As then set forth, it consisted of three distinct statements:

1. "The political system of the allied powers is essentially different in this respect from that of America. This difference proceeds from that which exists in their respective governments. And to the defense of our own, which has been achieved by the loss of so much blood and treasure, and matured by the wisdom of their most enlightened citizens, and under which we have enjoyed unexampled felicity, this whole nation is devoted. We owe it, therefore, to candor and to the amicable relations existing between the United States and those powers to declare that we should consider any attempt on their part to extend their system to any portion of this hemisphere as dangerous to our peace and safety. With the existing colonies or dependencies of any European power we have not interfered, and shall not interfere. But with the governments who have declared their independence and maintained it, and whose independence we have, on great consideration and on just principles, acknowledged, we could not view any interposition for the purpose of oppressing them, or controlling in any other manner their destiny, by any European power, in any other light than as the manifestation of an unfriendly disposition toward the United States.

2. "Our policy in regard to Europe, which was adopted at an early stage of the wars which have so long agitated that quarter of the globe, nevertheless remains the same, which is, not to interfere in the internal concerns of any of its powers; to consider the government *de facto* as the legitimate government for us; to cultivate friendly relations with it, and to preserve those relations by a frank, firm and manly policy; meeting, in all instances, the just claims of every power, submitting to injuries from none. But in regard to these continents, circumstances are eminently and conspicuously different. It is impossible that the allied powers should extend their political system to any portion of either continent without endangering our peace and happiness; nor can any one believe that our southern brethren, if left to themselves, would adopt it of their own accord. It is equally impossible, therefore, that we should behold such interposition, in any form, with indifference."

It happened that just at this time Russia had founded a colony in California, and had asserted her claim to the Pacific Coast as far south as lat. 51° N. This brought her in conflict with the United States, which then held the Oregon country in joint occupation with England. Against the action of Russia the United States protested, and held that as California belonged to Mexico, and as Mexico was an independent power, it was no longer open to European colonization. Monroe's words on this matter form the third part of his doctrine.

3. "The occasion has been deemed proper for asserting, as a principle in which the rights and interests of the United States are involved, that the American continents, by the free and independent condition which they have assumed and maintained, are henceforth not to be considered as subjects for future colonization by any European powers."

In plain language, the doctrine meant,—

1. The United States will "not interfere in the internal concerns" of any European power.

2. "But in regard to these continents [North and South America], circumstances are eminently and conspicuously different," and if any European power attempts at any future time to extend its political system to any part of this hemisphere "for the purpose of oppressing" the nations, or "*controlling in any other manner their destiny*," the United States will interfere.

3. No more colonization on the American continents by European powers.

J. B. McMaster.

MONROEVILLE, a post village and railroad center of Huron County, central northern Ohio, 60 miles W. of Cleveland, on the Baltimore and Ohio, the Lake Shore and Michigan Southern and the Wheeling and Lake Erie railroads. It has grain-warehouses, wagon-shops, organ factory, bending-works, and manufactures flour, beer, agricultural tools, fanning-mills and woolen goods. Population 1900, 1,211.

MONROVIA. See Liberia, Vol. XIV, p. 507.

MONSON, a village of Hampden County, Massachusetts, 15 miles E. of Springfield, on the Chicopee River, and on the Central Vermont rail-

road. It has a large state school for children of pauper aliens, a savings bank, an academy, and a public library containing six thousand volumes. Granite of fine quality is quarried here, and straw and woolen goods are manufactured. Population 1890, 3,650; 1900, 3,402.

MONSOON. See METEOROLOGY, Vol. XVI, p. 154.

MONT OR MENTU, a god. See EGYPT, Vol. VII, pp. 619, 620.

MONTAGUE, a village of Muskegon County, Michigan, in the center of the western border of the southern peninsula. It lies at the head of White Lake and the mouth of the White River, five miles from Lake Michigan, 46 miles northwest of the city of Grand Rapids, and is reached by the Chicago and Western Michigan railroad and by steamers on Lake Michigan. It is a shipping point for fruit and agricultural produce. Its population in 1900 was 998. W.F.J.

MONTALEMBERT, MARC RENÉ, MARQUIS DE, a French military engineer; born in Angoulême, July 16, 1714. He entered the army early in life and was attached to the Russian and Swedish staff during the Seven Years' War as the military agent of the French Government. He was the inventor of a system of fortification, which gave rise to much controversy. He died March 29, 1800. See also FORTIFICATION, Vol. IX, pp. 390, 411. W.M.C.

MONTALVO, GARCIA ORDONEZ. See ROMANCE, Vol. XX, pp. 670, 671.

MONTANA had a population, in 1890, of 132,159, that of 1880 having been 39,159—a gain for the ten years of 93,000, or 237.49 per cent, which was the third largest of any state in the Union during the same period. The population of the state by the twelfth census (1900), was 243,329. Of the inhabitants, 65,623 resided in the four cities of the state, which constituted 27.0 per

STATE SEAL OF MONTANA.

cent of the entire population. In 1900 there were four cities in Montana of 8,000 or upward, the number prescribed by the census authorities as necessary to constitute a city. The relative number of males and females in 1900 was 149,842 of the former and 93,487 of the latter. This gave but 38.40 females to each 100,000 males the lowest relative proportion of that of any of the states,—a position also held in 1890 and 1880. The percentage of native-born citizens was 72.4; of foreign-born, 27.6. The number of negroes in 1900 was 1,523,—a gain of 33 from 1890.

Montana was admitted to the Union, Nov. 8, 1889, being the twenty eighth state admitted and the forty-first in order. The area as given in 1900, is 146,080 square miles, of which 770 square miles are water surface and 145,310, or 92,998,400 acres, are land surface.

July 4, 1889, a constitutional convention met in Helena and adopted a state constitution, of which the following are the principal features:

1. There were to be three branches of the government,—legislative, executive and judicial.

2. The legislative authority was to be vested in a senate and house of representatives, the former to be elected for four years and the latter for two years. The sessions of the legislature were to be biennial, limited to sixty days after the first session, which was to be for ninety days. The usual powers to impeach and try state officers were granted, but the passage of local and special laws was not allowed, nor was the legislature to make appropriations for charitable, industrial, educational or benevolent purposes to any person, corporation or community not under the absolute control of the state, nor pass acts authorizing the state or any county to give financial aid toward the building of any railroad. In 1893 the senate consisted of 16 members and the house of 55.

3. The executive department was to consist of a governor, lieutenant-governor, secretary of state, attorney-general, state treasurer, state auditor and superintendent of public instruction, all of whom were to hold office for four years, with the exception of officers chosen at the first election, whose terms were to expire on the first Monday of January, 1893. The usual veto powers were given to the governor, and he was authorized to veto separate items of appropriation bills.

4. The supreme court was to consist of three judges, to be elected by the people for a term of six years, but the legislature was authorized to increase the number of judges to five when necessary so to do. The supreme court was to have appellate jurisdiction and a general supervisory control of the inferior courts.

5. Voters must be citizens of the United States, and resident one year in the state. Women were made eligible to vote at any school-district election, and, when tax-payers, were given the right to vote upon questions submitted to the vote of the tax-payers of the state, provided they possessed the qualifications required of men. Many radical innovations upon old usages were made, among which was the provision that in civil actions, and in criminal cases not amounting to felony, two thirds of the jury might render a verdict. Trusts, lotteries and contract labor in prisons were prohibited, and amendments to the constitution must receive a two-thirds vote of each house and a majority of the votes at the next popular election. Provision was made for taking a state census in 1895 and each tenth year thereafter. The state tax was limited to three mills until the taxable property of the state should reach $100,000,000, when the rate should not exceed two mills and a half, and when the valuation should be $300,000,000 the rate should not exceed one mill and a half.

The state capital was fixed temporarily at Helena, the final location to be submitted to a vote of the people. At the general election in 1892 no city received a majority of all of the votes cast, and in accordance with the provision made for such an event, Helena and Anaconda, having received the largest number of votes, were submitted to the people at the next general election, and Helena was selected as the permanent capital.

The mineral resources of the state are unsurpassed, making her mining interests paramount. Copper, silver and gold, constitute her chief wealth in this respect. Lead, iron, and antimony are abundant, and fully 60,000 square miles are underlaid with the best quality of bituminous and lignite coals. The production of gold for 1900 amounted to $5,126,410, and the total production from 1862 aggregated $203,941,478. The silver-production for 1899 reached $21,786,458,—more than $5,000,000 less than the output of 1893. The total product from 1876 was $257,998,425. In the production of copper Montana has long led the other states of the Union, producing almost 40 per cent of the entire product, the most of this coming from the locality of the city of Butte. The output for 1899 was $40,942,692,—more than 245,000,000 pounds. The lead-production for the same year aggregated 25,566,188 pounds. The products of the gold, silver, copper and lead mines for the year mentioned amounted to within a few dollars of $69,000,000. Conservative estimates of the total production of the metals named from the beginning of operations places the value at $420,000,000. Iron ore of excellent quality exists in inexhaustible quantities, but has not yet been developed to any considerable extent. The fuel for reducing to the pig is abundant, the coal and coke produced in 1899 reaching the value of $2,347,000, and the total amount produced since 1883 aggregated $12,133,392. Garnets, carbuncles, sapphires and rubies are among the precious stones found in the gravel deposits of the state, and experts have pronounced the discovery of the sapphire and ruby mines of Montana the most important gem-find of modern times.

Roundly estimated, one-third of the area of Montana may be classed as arable, susceptible of cultivation if irrigated, one third as grazing-lands, and one third as forest or mineral lands, the gold, silver and copper veins being generally in the timbered country. This estimate would give 30,000,000 acres of lands available for cultivation if irrigated, while the assessors' returns for 1893 show that only 1,500,495 acres were fenced, that only 395,290 acres were cultivated, and that of this 253,374 acres were hay-lands, leaving only 131,916 acres in grain, vegetables, etc. So far, farming has been confined almost wholly to the lands along the streams, first bottom lands being cheaply irrigated by simply diverting the water from the streams adjacent. The general staple products of Montana are about the same varieties as those of many of the states of the Union, and of France, Germany, Austria and Russia; namely, wheat, oats, barley, rye, potatoes, and other root crops. The quality and yield, however, are rarely excelled in the world. Ten awards were received at the World's Fair,—two on wheat, two on barley, one on oats, two on timothy and one on blue-joint. The following table shows the production and value of the principal crops of Montana for the year 1900:

Crops.	Bushels.	Value.
Corn	75,838	$ 41,626
Wheat	1,899,683	1,077,210
Oats	4,746,231	1,790,938
Barley	844,140	341,308
Rye	33,120	16,546
Buckwheat	168	98
Hay and forage (tons)	1,059,361	5,974,850
Potatoes	1,332,062	661,163
Dry pease	32,265	33,273
Onions	29,113	22,612

In 1900 the following returns were made by the assessors: Horses, 329,972; milch cows, 45,036; neat cattle, 923,351; sheep and lambs, 6,170,483; and swine 49,496. In 1900, as shown by the twelfth decennial census, there were 13,370 farms in Montana, as against 5,603 in 1890 and 1,519 in 1880. The total value of the farm lands, fences, buildings, farm machinery and implements and live-stock was, in 1900, $117,859,823, as compared with $48,489,037 in 1890 and $8,787,243 in 1880.

It is estimated that the area available for grazing, covered with nutritious grasses, and not having water available for agricultural purposes, will reach 40,000 square miles. Cattle-raising has long been one of the leading and most profitable of the agricultural industries, as cattle range the year around, requiring little care until fitted for shipment. In 1895, 215,534 Montana cattle were shipped to Chicago alone, and the total net value of all marketed was $10,600,000. The wool-clip of 1894 reached 6,527,469 pounds, and that of 1895 was considerably heavier, the receipts for both wool and mutton for the year aggregating more than $2,000,000. Clip of 1899, 30,437,829 pounds.

The total assessed valuation of Montana, after equalization, in 1900, amounted to $167,570,306,—a decrease of over $9,000,000 from the assessment of 1893, and more than $23,000,000 from that of 1891. This was due to the depreciation in values, principally of real estate, which in 1900 was placed at $75,610,636, and the personal property at $63,177,799. The mines of the state are not taxed as property, but the net proceeds are subject to taxation. The decreased operations in the silver-mines are also a contributing cause to the lowering of the assessed valuation. The census authorized by law to be taken in 1895 was completed on the date of March 31st, of that year, and the result showed the population to have been 182,490, or an increase of 50,331, almost forty per cent, for the five years. The state treasurer reported on Nov. 30, 1901, as follows. Balance on hand Dec. 1, 1901, $544,686; received during the year, $1,343,838; paid out during the year, $1,303,779; balance on hand, $584,745.

The counties of the state reported no bonded indebtedness in the year 1899. The state proper had no debt at the time, and is prevented by constitutional enactment from incurring indebtedness in excess of $100,000, except in case of war or to suppress insurrection. The counties are prohibited from becoming indebted to an amount exceeding five per cent of the taxable property therein.

On Oct. 31, 1900, there were 21 national banks in liquidation in the state, with an aggregate paid-up capital of $2,305,000. There were also 6 private banks, with resources of $4,096,312, with a combined capital amounting to $271,000, and deposits, subject to check, of $3,509,883. The 15 state banks had resources amounting to $8,366,269, a capital stock paid in of $990,000, and deposits subject to check amounting to $6,066,057.

In 1900 the total number of railroads in Montana was 30; the miles of road within the state, 3,025; and the total assessed value, $15,100,000. One or more of these different lines of road is in operation in every county of the state, except Fergus, and nearly all principal valleys, cities, towns and mining-camps were accessible by rail at the beginning of 1900.

In 1899 there were, in the state, 656 public schoolhouses, with 1,086 teachers and 35,070 pupils. In addition there were 32 private schools, with 839 pupils. The wages of male teachers averaged $130 per month; those of females, $80. The total expenditures for teachers' wages for the year was $483,221. The value of the schoolhouses and grounds was $1,857,964. Other special educational institutions in a number of cities and towns include the State University, Agricultural College, School of Mines, and State Normal School, all of which are largely endowed, as are several others.

In 1894 there were 10 Congregational, 31 Presbyterian, 46 Methodist Episcopal, 17 Methodist Episcopal Church South, 31 Episcopal, 14 German Lutheran, 18 Baptist and 19 Christian churches, missions or organizations, with 9,872 members and 13,931 Sunday school scholars. There were 94 Roman Catholic churches, missions or organizations, with a membership of 29,309. There are a number of other religious organizations in the state, of which no statistics later than the census of 1890 are available, at which time the following figures were given. A comparison will show the growth of many of the denominations: There were 273 church organizations in the state, 164 edifices, a membership of 32,478, which constituted 24.57 per cent of the population, and church property of the value of $885,950. The denominations represented numbered 16, the most prominent, in point of numbers, being the Baptists, all bodies, 14; Roman Catholics, 94; Disciples of Christ, 13; all Methodists, 74; all Presbyterians, 24; and Protestant Episcopals, 30.

The state institutions of Montana include the Eastern State Prison, located at Billings; the Western State Prison, located at Deer Lodge; the State Insane Asylum, located at Warm Springs; the State Reform School, located at Miles City; the Home for Orphans, Foundlings and Destitute Children, located at Twin Bridges; the State School of Mines, located at Butte; the Deaf and Dumb Asylum, located at Boulder; and the State Normal School, located at Dillon.

The authorized strength of the National Guard of Montana is 585. The force in 1895 consisted of one regiment of infantry and a signal corps, the strength being 57 officers and 438 enlisted men. The state appropriation in 1894 was $21,700. The government appropriation in 1895 was $2,587.

In January, 1899, there were 92 newspapers published in the state of Montana. One or more papers were published in all of the 23 counties, in 45 of the cities, towns and villages, and in 22 county seats. Of the whole number of papers, 12 were daily, 1 triweekly, 1 semiweekly, 69 weekly, 2 semimonthly, and 7 monthly.

In 1895 there were free public libraries in the following towns and cities of Montana: Anaconda, Bozeman, Butte, Dillon, Great Falls, Helena and Missoula. School libraries contained about 8,000 volumes, distributed among some 15 places. Colleges and academies had libraries in the following places: Bozeman, Deer Lodge, Twin Bridges and Helena (2). In addition to the foregoing there are other small libraries and reading-rooms, to the number of 15 or 20.

The following are the principal cities and towns of Montana, with the population as given in the census of 1900: Helena, 10,770; Butte City, 30,470; Great Falls, 14,930; Anaconda, 9,453; Missoula, 4,366; Livingston, 2,778; Bozeman, 3,419; Walkerville, 2,621; Red Lodge, 2,152; and Deer Lodge, 1,324.

The following is a list of the governors of Montana, territorial and state, together with their respective terms of office: *Territorial*—Sidney Egerton, 1864–65; Thos. F. Meagher (acting), 1865–66; Green C. Smith, 1866–69; Jas. M. Ashley, 1869–70; Benj. F. Potts, 1870–82; J. Schuyler Crosby, 1882–84; B. Platt Carpenter, 1884–85; S. T. Houser 1885–86; P. H. Leslie, 1886–89. *State*—J. K. Toole, 1889–92; J. E. Rickards, 1893–97; R. B. Smith, 1897; Jos. K. Toole, 1901. See also MONTANA, Vol. XVI, pp. 798–800. *Revised by* R. C. A.

MONTANA, UNIVERSITY OF, a state institution of learning, was formally opened Sept. 11, 1895. The University grounds comprise forty acres, on the south side of the Missoula River, near Missoula. The university building is a modern brick structure, containing three stories and a basement. The lecture-rooms are on the first floor, the laboratories and library on the second and the assembly-room on the third. There are six professors for the following departments: history and literature; natural science; mathematics; modern languages, combined temporarily with the department of applied science; music. The courses are: the classics, leading to the degree of A. B.; philosophy, leading to the degree of B. Ph.; science, leading to the degree of

B.S.; and applied science, to be developed into different courses, leading to degrees in the industrial arts. There is a preparatory department. The number of students (1901) was 235, and of instructors 13. The various laboratories were fairly well equipped, and the library has 6,300 volumes.

MONTAUK POINT is the extreme southeastern corner of New York state, in Suffolk County, Long Island. It gets its name from an Indian tribe now nearly extinct. It is reached by the Long Island railroad, is frequented by summer pleasure seekers, and is marked with a lighthouse with a white light. W.F.J.

MONT BLANC. See BLANC, MONT, Vol. III, p. 700.

MONTCALM, LOUIS JOSEPH DE SAINT VÉRAN, a French soldier; born near Nîmes, France, Feb. 29, 1712. He entered the army when 14 years old; served in Italy in 1734, in Germany during the war of the Austrian Succession, and again in Italy, where he gained the rank of colonel at the battle of Piacenza in 1746. By 1756 he had attained the rank of brigadier-general, and was appointed to command the French troops in Canada, where he arrived in May, and entered on a vigorous campaign against the English. On August 14 he carried Fort Ontario at Oswego, and the next year took Fort William Henry at Lake George, with 42 guns, a large store of provisions and ammunition, and over 2,500 prisoners. In 1758, with 3,600 men, he successfully defended Fort Carillon at Ticonderoga, and at this time it seemed as if French supremacy in North America might be maintained. But supineness in the French government deprived him of the necessary re-enforcements, and he already foresaw the downfall of the French power. But he actively prepared for the campaign of 1759, in which he was to be opposed by England's greatest strength and energy. Quebec was then the key to the situation, and in an attack below the city by Gen. Wolfe, supported by the fleet, Montcalm repelled the invaders with considerable loss. Changing his plans, Wolfe brought his forces by night up the St. Lawrence, and landed them at the foot of the Heights of Abraham, which they scaled, deploying in the rear of Montcalm's army on Sept. 13. The armies were about equal in numbers, each having about 5,000 men. Montcalm led the attack in person, but his troops broke before the deadly fire and solid front of the British, and when Wolfe in person headed a bayonet charge, the French gave way entirely and fled. Wolfe was killed in the moment of victory, and Montcalm, who had been wounded earlier in the day, died the next morning. A monument in the Governor's Garden, Quebec, perpetuates the memory of the two generals. A Latin inscription records: "Valor gave them a common death, history a common fame, and posterity a common monument." E.E.T.

MONTCLAIR, a town of Essex County, New Jersey, in the northeastern part of the state, forming an important suburb of Newark and New York. It lies in the northern part of the Orange Mountains, eight miles from Newark, and is reached by the Delaware, Lackawanna and Western, and the New York and Greenwood Lake railroads. It has some industries, but is chiefly residential, its elevation among the hills and its picturesque scenery making it a favorite home for New York and Newark business men. Its population in 1900 was 13,962. W.F.J.

MONT-DE-PIÉTÉ, a French institution, better described as a bank of charity, where money is loaned in small sums on pledges. See also PARIS, Vol. XVIII, p. 289, and PAWNBROKING in these Supplements. W.R.B.

MONTE CARLO. See MONACO, Vol. XVI, pp. 743–744.

MONTEFIORE, SIR MOSES, an English philanthropist; born in Leghorn, Italy, October 24, 1784. He came of an old Jewish family that had settled in England in the beginning of the eighteenth century. He was early employed by a firm of wholesale tea merchants, but subsequently left that trade for the Stock Exchange, having received a license, at that time essential for a Jewish broker. He succeeded in business so well that in 1824 he retired with a colossal fortune, and devoted the remainder of his life to municipal and philanthropic work. In 1837 he was nominated sheriff of London, when he was knighted. He subsequently became high sheriff of Kent, and was created a baronet in 1846. He undertook to alleviate the Jewish persecution in various countries, chiefly in Poland, Russia, Roumania, and Damascus. He made seven journeys to the East, the first in 1827 and the last in 1874, mainly for the amelioration of the condition of the Jews. At Bucharest, during an anti-Jewish tumult, he boldly faced the mob at the risk of his life. At Ramsgate, England, in 1865, he endowed a Jewish college in memory of his wife who had died in 1862. He was presented with the freedom of the city of London in 1873. He died in Ramsgate, England, July 29, 1885. W.M.C.

MONTÉGUT, ÉMILE, a French writer; born at Limoges, France, June 24, 1826. His first publication was an article in the *Revue des Deux Mondes* for August, 1847, on the philosophy of Emerson, which was followed by a series of studies of English and American literature. In 1857 he succeeded Gustave Planche in the political reviewing department of the *Revue*, which position he filled until 1862, when he transferred his services to the *Moniteur Universel*. He translated into French the *Complete Works of Shakespeare* (10 vols., 1868–73) and Macaulay's *History of England*. He died Dec. 11, 1895.

MONTEMAYOR, JORGE. See PASTORAL, Vol. XVIII, p. 351.

MONTEREY, a post village and the capital of Monterey County, western central California, situated on the southern portion of Monterey Bay, and 84 miles S.E. of San Francisco; also close to Carmel Bay and Point Lobos. Is reached by land by the Southern Pacific railroad and the Monterey

and Fresno railroad. A line of steamers runs north to San Francisco, and another line south to Los Angeles and Santa Barbara. It is a resort frequented much by eastern people, who find the climate very beneficial. The fishing industry is carried on to a great extent, and fish is shipped from there to many eastern cities. When California was a Mexican province Monterey was its capital. It is the seat of a Catholic bishopric. Population 1890, 1,662; 1900, 1,784.

MONTESANO, a post village, the capital of Chehalis County, central western Washington, 60 miles S. W. of Olympia, on the south bank of the Chehalis River, and 12 miles from its mouth. Is reached readily by the Northern Pacific railroad. Has three banks, two weekly newspapers, two sawmills, a furniture factory, sash-and-door factory and tannery. It is a good farming and stock-raising district. Salmon fishing and canning is a principal industry. Population 1900, 1,194.

MONTEVIDEO, a post village, the capital of Chippewa County, Minnesota, situated at the mouth of the Chippewa, where it enters the Minnesota River. Is reached by the Chicago, Milwaukee and St. Paul railroad. Has three weekly papers, seven churches, three banks, a state high-school and other schools, several elevators and two large flour-mills. Population 1900, 2,146.

MONTEVIDEO, the principal city and capital of Uruguay, South America. It has an important maritime trade, about 80 % of the foreign trade of Uruguay passing through its port. In 1899, 3,974 vessels of 4,105,102 tons entered the port. Extensive harbor improvements have been made. Population 1901, 268,334. See MONTEVIDEO, Vol. XVI, p. 812.

MONTEZUMA, a post village and the capital of Poweshiek County, Iowa, in Jackson township, situated 62 miles E. of Des Moines. It is on the Chicago and Northwestern, the Grinnell and Montezuma, the Iowa Central and the Burlington, Cedar Rapids and Northern railroads. Its principal industries are farming and dairying. It also has extensive coal-fields. Population 1890, 1,062; 1900, 1,210.

MONTEZUMA OR MOTEUCZOMA, DYNASTY OF. See MEXICO, Vol. XVI, pp. 217–218; and CORTEZ, Vol. VI, pp. 390–391.

MONTGOLFIER. See AËRONAUTICS, Vol. I, p. 169.

MONTGOMERY, the capital of Alabama, has four railroads, the Louisville and Nashville, Western, Georgia Central and the Montgomery and Florida, which furnish connections with all inland points, while steamers connect with different lines for domestic and foreign ports. It is in a rich cotton-growing region. Its annual receipts are from 130,000 to 140,000 bales. Water is supplied by the Alabama River, also by an artesian-well system which furnishes 5,000,000 gallons daily. One of its handsomest buildings is the Masonic Temple. The city is lighted principally by electricity, and has 15 miles of electric street-railways. Among some of its manufactures are alcohol. candy, crackers, brooms and soap. There are six brick-yards to supply the building-material. Large coal and iron mines are found

CAPITOL BUILDING, MONTGOMERY, ALABAMA.

within 60 miles of the city, and immense forests of pine are also in the vicinity. Pop. 1890, 21,883; 1900, 30,346. See Vol. XVI, p. 816.

MONTGOMERY, a post village in Orange County, New York, 70 miles N. by W. of New York City. It is on the Wallkill River, and on the Wallkill Valley and Montgomery and Erie railroads. Its principal industry is a paper-mill and woolen factory. It is in an agricultural and dairying region. Population 1900, 973.

MONTGOMERY, RICHARD, an American soldier; born near Raphoe, Ireland, Dec. 2, 1736. At the age of 18 he obtained a commission in the British army, and in 1757 commenced a career of active service in America. At the siege of Louisburg in 1758 he gave evidence of high military capacity. He also distinguished himself in the expeditions against Havana and Martinique, and in 1763 obtained permission to revisit Europe, where he remained for the next nine years. He then sold out his commission, and, emigrating to New York, married a daughter of Judge Robert R. Livingston and settled in Rhinebeck, N. Y. In 1775 he represented Dutchess County in the Provincial Congress, and later was appointed brigadier-general in the Colonial army. He commanded a division that captured Forts Chambly and St. John's, and took possession of Montreal, thereby becoming in the middle of November, master of a great part of Canada. On Dec. 4, 1775, he effected a junction with Benedict Arnold and marched against Quebec. It being decided to attempt to carry the city by assault, Montgomery headed the attack on Cape Diamond bastion. The first barrier was successfully passed, but in rallying his men for the attack on the second barrier he was shot dead. His men, panic-stricken by the loss of their leader, broke and fled in disorder, and the expedition ended in failure. In 1818 Montgomery's remains were removed from Quebec, where he was first buried, and placed under a monument erected by Congress in front of St. Paul's Church, New York city. E.E.T.

MONTGOMERY CITY, a post village of Montgomery County, Missouri, 82 miles W. of St. Louis, on the St. Louis, Kansas City and Northern and the Wabash railroads. Farming

and dairying are the chief occupations. The place contains a college, mill and manufactory. Population 1890, 2,199; 1900, 2,026.

MONTH. See CALENDAR, Vol. IV, pp. 590–591.

MONTHOLON, CHARLES TRISTAN, COMTE DE (1782–1853). See NAPOLEON, Vol. XVII, p. 232.

MONTICELLO, a town and the capital of Drew County, in southeastern Arkansas, on the St. Louis, Iron Mountain and Southern railroad, 85 miles S. by E. of Little Rock, the state capital, and 35 miles W. of the Mississippi River. It is located in a cotton-growing district, and there are large ocher-beds in the vicinity. Population 1890, 1,285; 1900, 1,579.

MONTICELLO, a town and the capital of Jefferson County, in northern Florida, on the Savannah, Florida and Western and the Silver Springs, Ocala and Gulf railroads, 30 miles E. of Tallahassee and 142 miles W. by N. of Jacksonville. It is located in a cotton-growing region as well as a fruit-growing district. Population 1890, 1,218; 1900, 1,076.

MONTICELLO, a post village, a railroad junction, and the county seat of White County, Indiana, 21 miles W. of Logansport and 75 miles S.W. of Indianapolis, on the Tippecanoe River, and on the Louisville, New Albany and Chicago railroad. It has manufactories of paper, furniture and woolen goods. Population 1900, 2,107.

MONTICELLO, a city and the capital of Piatt County, eastern central Illinois, on the Sangamon River, and on the Illinois Central and Wabash railroads, 56 miles N.E. of Springfield. Monticello is a thriving town, having many industries, prominent among which are a foundry, brick and tile works and a patent-fence factory. Much corn is grown in this district. Population 1900, 1,982.

MONTICELLO, a post village in Monticello township, Jones County, Iowa, situated near the extreme western boundary of the state, on the Chicago, Milwaukee and St. Paul railroad, 9½ miles N. of Anamosa, where the state penitentiary is situated. Monticello is a rich farming district, and has a factory where gloves and mittens are made; also manufactures feather dusters and feather trimmings. Population 1890, 1,938; 1900, 2,104.

MONTICELLO, a village and the county seat of Sullivan County, New York, in the southeastern part of the state, 75 miles northwest of New York city. It lies among mountains and lakes, at an elevation of more than 1,500 feet, and has a cool summer climate and a most salubrious air, for which reasons it is frequented by many pleasure seekers and by invalids. It is reached by the Port Jervis, Monticello and New York railroad. Its population in 1900 was 1,160.

W.F.J.

MONTMORENCY, FALLS OF. See QUEBEC, Vol. XX, p. 171.

MONTPELIER, a town in Bear Lake County, southeastern Idaho, north of North and Bear Lakes, on the Union Pacific railroad. It is surrounded on the west by the Bear River range of mountains and on the north by the Aspen ridge and the Preuss range. It is an agricultural exporting town as well as a mining center. Population 1890, 1,174; 1900, 1,444.

MONTPENSIER, ANTOINE MARIE PHILIPPE LOUIS D'ORLÉANS, DUC DE, a French prince and claimant to the Spanish throne; fifth son of Louis Philippe, king of France, born in Neuilly, July 31, 1824. He entered the French army and gained some distinction in the African campaign of 1844. In October, 1846, he married Maria Louisa, the sister of Isabella II of Spain, the object of the arrangement being to secure his eventual succession to the throne of Madrid. After the Revolution of 1848 he took up his residence in Spain, and intrigued vigorously against his sister-in-law, who banished him in 1868. His candidature, however, was unsuccessful, and in March, 1870, he further damaged his cause by killing his cousin and political opponent, Don Henri de Bourbon, in a duel. During the troubles of the following years, Montpensier remained in seclusion, but upon the death of Alfonso in 1885, he was again informally mentioned as a candidate for the throne. He died at his estate in San Lucar, near Seville, Spain, February 4, 1890.

W.M.C.

MONTREAL, MOREALE OR MONREAL D'ALBAENO. See CONDOTTIERI, Vol. VI, p. 227.

MONTREAL, a city in the province of Quebec, Dominion of Canada, situated on Montreal Island, the largest city and chief commercial center of Canada. For early history, see Vol. XVI, p. 819. Transportation is furnished Montreal by the Grand Trunk, Canadian Pacific, Intercolonial, Canada Atlantic, New York Central, Central Vermont, and Delaware and Hudson railways, and, during the season of navigation, several lines of steamers maintain communication with Glasgow, Liverpool, Manchester, Bristol and points on the Great Lakes. The famous Victoria bridge was replaced in 1898 by the Victoria Jubilee bridge to meet the increased demands of traffic. The city contains many flourishing industries and modern educational institutions. Population 1901, exclusive of the adjoining suburbs, 266,826.

MONTROSE, a town and the capital of Montrose County, western Colorado. It is on the Denver and Rio Grande railroad and on the Uncompahgre River. Fort Crawford Station is 6 miles S. and Denver is 353 miles N.E. It is in a farming and fruit-growing district. Population 1890, 1,330; 1900, 1,217.

MONTROSE, a post borough, the capital of Susquehanna County, Pennsylvania, eight miles from Montrose Station. It is on the Delaware, Lackawanna and Western and the Montrose division of the West Shore railroads. It is two thousand feet above sea-level, and is much frequented as a summer resort. It is located in an agricultural region, and has manufactures of farming-implements and leather, etc. Population 1890, 1,735; 1900, 1,827.

MONTS. PIERRE DU GUAST DE, director French

Canadian Company (1560–1611). See GEOGRAPHY, Vol. X, p. 167.

MONTT, JORGE, a Chilean sailor and statesman, son of Manuel (q. v.), was born in Santiago in 1847. He had a brilliant career on the sea, especially during the Chilean-Peruvian war, and rose to the rank of captain. He took sides with Congress against President Balmaceda, and helped in his final overthrow. As a reward he was promoted to a vice-admiralship. Having been chosen a member of the provisional junta of government, he was elected, Nov. 6, 1891, President of the Republic. His term expired in September, 1896, and was, on the whole, a period of peace and recuperation for his country. See also CHILE, in these Supplements.

MONTT, MANUEL, a Chilean statesman; born in Petorca, Chile, Sept. 5, 1809. He was graduated from the National Institute in Santiago, and was engaged as a professor there until he entered upon his duties as assistant secretary of state in 1836. In 1837 he was called upon in his official capacity to suppress a serious rebellion which feat he successfully accomplished. In the year 1838 was made a judge of the supreme court. His election to the chamber of deputies followed, and he was for a time president of that body. He was minister of justice for four years and of the interior for two years. He was elected president in 1851, and under his policy many industrial improvements were introduced. He also founded the University of Chile. After the expiration of his second term he resigned his office and assumed the presidency of the supreme court. Montt was president of the American Congress, which met in Lima in 1865. He died in Santiago. Chile, March 13, 1881. W.M.C.

MONTYON PRIZES, rewards for signal instances of philanthropy discovered throughout the year, awarded by the French Academy, according to the will of Jean-Baptiste-Robert Auger, Baron de Montyon, who bequeathed $600,000 to public hospitals, and the remainder of his fortune to give sums of money to poor patients on leaving Paris hospitals, and to found the prizes since connected with his name. The Academy of Sciences also awards annually a prize of 10,000 francs to the individual who has discovered the means of making any mechanical occupation more healthy, and another of equal value for improvements in medicine and surgery; while the Forty themselves award the prizes of virtue, and another series of prizes to the writers of the works likely to have the greatest beneficial influence on morality—the total apportioned to each category of prizes being 10,000 francs annually.

MOODY, DWIGHT LYMAN, evangelist and educator; was born at Northfield, Massachusetts, on February 5, 1837, and spent his boyhood on a farm. He then became a clerk in a store in Boston, and then in Chicago. About 1859 he began to be prominent as a religious speaker, during the Civil War he was active in the Christian Commission, and after the war became the pastor of a very large independent church in Chicago, though he was never ordained as a clergyman. In company with Ira D. Sankey, a singer, he went to England in 1873–75 on an evangelistic or "revival" tour, with unprecedented success. Returning to America, the same work was continued here in various large cities, until Mr. Moody was said to have addressed more people than any other man in the world. He founded a great Bible institute in Chicago, and an unrivalled school for Christian workers at Northfield, which has been further developed since his death. He was the author of several religious books and many volumes of sermons, which have been widely circulated. He died at Northfield on Dec. 22, 1899. W.F.J.

DWIGHT L. MOODY.

MOODY, WM. HENRY, congressman, and since March, 1902, Secretary of the U. S. Navy in President Roosevelt's Cabinet, was born at Newbury, Mass., Dec. 23, 1853, and is a graduate of Harvard (1876). Studying law and being admitted to the Bar, he became district attorney for the Eastern District of Massachusetts in 1890, and from 1895 has represented the 6th Mass. Dist. in Congress. He has served on important committees of the House, and is known as a man of much force and high character. He is an excellent speaker.

MOON ALPHABET. See BLIND, Vol. III, p. 718.

MOONEY, JAMES, an American ethnologist and author; born in Richmond, Indiana, February 10, 1861. He received a common school education and in 1879 entered a newspaper office. Meanwhile he had taken up the study of the native races of America and in 1885 became a member of the Bureau of Ethnology at Washington. He has made a series of investigations covering the language, manners and customs of the Southern and Western Indian tribes, and prepared the government Indian exhibits for the Chicago, Nashville, Omaha and St. Louis expositions. He has published *Medical Mythology of Ireland* (1887); *Holiday Customs of Ireland* (1890); *The Ghost Dance Religion and the Sioux Outbreak of 1890* (1892–93), and numerous monographs on ethnology. His list of 3,000 tribal names formed the basis for a *Dictionary of Tribal Synonyms* compiled by the government. W.M.C.

MOON-EYE. See GOLD-EYE, in these Supplements.

MOONSTONE. See MINERALOGY, Vol. XVI, p. 437.

MOORE, a family of English artists of distinction. The father, WILLIAM, was a portrait and landscape painter of some reputation.—His eldest son, HENRY, born in York, England, March 7, 1831, received his artistic education first in his father's studio and later at the Langham Schools; exhibited for the first time at the Royal Academy in 1853. He devoted himself to marine and landscape painting. His work

was appreciated in France much sooner than in his own country. He was awarded the Grand Prix at the Paris Exposition of 1889, and made a knight of the Legion of Honor. In 1893 he was elected a member of the Royal Academy. His technique and his comprehension of color were strikingly original, and yet true to nature. He sent to the Philadelphia Exhibition (1876) *A Winter Gale in the Channel* and *Storm Coming on at Sunset, Coast of Wales;* his *Summer Breeze on the Channel* was awarded a special diploma (1894); other famed pictures are *Rough Weather on the Mediterranean* and *A Bright Morning after a Gale* (1878). Died in Margate, June 22, 1895.—His brother, ALBERT JOSEPH, was born in York, Sept. 4, 1841. He also studied at the Langham Schools; made his specialty of the human figure treated decoratively, and reached a high rank among modern artists. Some of his best paintings are: *Battledore and Shuttlecock* (1871); *Beads*, and the *Palm Fan* (Paris Exposition, 1878); *Shells; The Flower Walk; The Marble Seat.* Died at Westminster, Sept. 25, 1893.

MOORE, CLEMENT CLARKE, an American educator; born in New York, July 15, 1779. He graduated at Columbia College in 1798. In 1809 he published a *Hebrew-English Lexicon* with notes, a grammar, and a complete vocabulary of the Psalms. He was appointed professor of "Biblical learning, the department of interpretation of Scripture being added," in the New York Diocesan Seminary; and on the union of that institution with the General Protestant Episcopal Seminary in December, 1821, he was reappointed with the title of professor of Hebrew and Greek literature, which was afterward changed to that of Oriental and Greek literature. To this institution he afterward made a gift of the large plot of ground whereon the Seminary was built. He retired from office with the title of professor emeritus in June, 1850. He published a volume of *Poems* in 1844, and a Life of Scanderbeg in 1850. He died in Newport, R. I., July 10, 1863.
E.E.T.

MOORE, DAVID HASTINGS, an American clergyman; born in Athens, Ohio, September 4, 1838. He was graduated from the Ohio University in 1860 and ordained to the ministry in the Methodist Episcopal Church six months after his graduation. He entered the army at the outbreak of the Civil War, serving until the close of the war, and obtained the rank of lieutenant-colonel. From 1875 to 1880 he was president of the Cincinnati Wesleyan College and from 1880 to 1889 was president of the Colorado Seminary, and chancellor of the University of Denver. During 1889 he was professor of political economy at the Colorado University and was editor of the *Western Methodist Christian Advocate.* He was elected bishop in 1900 and since 1901 has been stationed in Shanghai, China, in charge of the missions of China, Japan and Korea. W.M.C.

MOORE'S HILL, a village in Sparta township, Dearborn County, Indiana, on the Ohio and Mississippi railroad, 40 miles W. of Cincinnati. The village is prominent only as being the seat of Moore's Hill College, an institution for both sexes, organized in 1854. It is Methodist Episcopal, having in 1901 ten instructors, 174 students, and 5,000 volumes in the library.

MOOR-FOWL OR RED GROUSE. See GROUSE, Vol. XI, p. 197.

MOORHEAD, a city and the county seat of Clay County, Minnesota, in the central part of the western border of the state, is an important wheat-shipping center. It is reached by the Northern Pacific, the Great Northern, and the Chicago, Milwaukee and St. Paul railroads, and had in 1900 a population of 3,730. W.F.J.

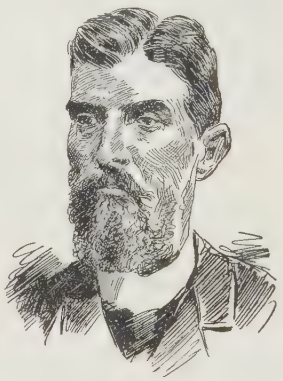
MOORS. See AFRICA, Vol. I, p .234.

MOORUK. See CASSOWARY, Vol. V, p. 162.

MOOSE. See DEER, Vol. VII, p. 23.

MOQUI INDIANS. See PUEBLO INDIANS, in these Supplements.

MORAES-BARROS, PRUDENTE JOSÉ DE, a Brazilian statesman; born in Sao Paulo state, Brazil, in 1845; educated in the State University, where he graduated in law. During the empire he made his political début in the Chamber of Deputies, where he and Campos Selles were the only avowed Republicans. After the deposition of Dom Pedro and the proclamation of the Republic in 1890, he was one of the triumvirate who took in their hands the direction of affairs in Sao Paulo. His native province sent him to Rio, where he presided over the labors of the constitutent assembly and gained great influence. On the organization of the Senate he was elected Vice-President, and at the time of the first Presidential election in 1891 was nominated by an influential section of the moderate Republicans to stand against Marshal Deodoro da Fonseca; he failed to secure election, but received a large number of votes. Shortly afterward he was elected president of the senate. On March 1, 1894, at the height of the great rebellion, Moraes was elected President by an overwhelming majority, to succeed President Peixoto. He adopted a peaceful and constitutional policy, and contributed powerfully to the pacification of the country.



P. J. MORAES-BARROS.

MORAINE. See GEOLOGY, Vol. X, pp. 250, 327.

MORALITIES. See DRAMA, Vol. VII, p. 359.

MORAL PHILOSOPHY. See ETHICS, Vol. VIII, pp. 506–537.

MORAN, a family of distinguished American artists, who settled in the United States in 1844. The eldest brother, EDWARD, was born in Lancashire, England, in 1829; he studied in Philadelphia under James Hamilton, the marine painter, and Paul Weber, the landscape artist; he studied in London (1862–69), when he returned to this coun-

try; he sojourned in Paris (1877–88); was elected to the National Academy, and died, June 9, 1901. Among his paintings, drawings and etchings are *The Hawk's Nest; Minot's Ledge Light; The Winning Yacht; Moonlight on New York Bay;* and *Coming Storm Over New York Bay*—(his five exhibits at the Centennial Exhibition, 1876); also *Launch of the Lifeboat; The Lord Staying the Waters;* and *Off Cape Hatteras.*

MORAN, LÉON, son of Edward, was born in Philadelphia, Pa., in 1864. He studied with his father, in the National Academy of Design, New York, and in France. Among his works are a *Madonna and Child; Intercepted Despatches; An Interrupted Conspiracy;* etc. E.E.T.

MORAN, MARY NIMMO, wife of Edward; an American etcher; born in Strathanen, Scotland, Jan. 20, 1842. At the age of nine she removed to the United States, and in 1863 married her instructor, Edward Moran. She early developed a taste for etching, and has acquired a considerable reputation. Among her most noted etchings are *Under the Oaks; A Windmill and a Pond;* and *A Summer at Easthampton.* W.M.C.

MORAN, PERCY, son of Edward, was born in Philadelphia, Pa., in 1862. He studied with his father and with S. J. Ferris, at the Pennsylvania Academy, the National Academy of Design, New York, and in London and Paris. He is best known as a painter of colonial subjects and modern women, and is represented in well-known American collections. E.E.T.

MORAN, PETER, brother of Edward and Thomas, was born in Bolton-le-Moors, Lancashire, England, in 1842. He studied under his brother Edward, and in London, and painted studies of animal life and landscapes. In 1876 he exhibited *The Return of the Herd* and *A Settled Rain.* Other pictures by him are *Twilight; After the Chase; A Sunny Slope.* He is also well known as an etcher.

MORAN, THOMAS, brother of Edward and Peter, was born in Bolton-le-Moors, Jan. 12, 1837. He was educated in the public schools of Philadelphia, Pa.; learned wood-engraving; and afterward studied art under James Hamilton, and later in Paris and Italy. He commenced painting water-color landscapes in 1856, became known as an illustrator and landscape artist, and accompanied the government expedition to the Yellowstone region in 1871. In 1873 he went with Major Powell's expedition to the Colorado River, and painted the two pictures, *The Grand Cañon of the Yellowstone,* and *The Chasm of the Colorado,* now in the Capitol at Washington. He has since painted a large number of notable pictures and has been a member of the National Academy of Design since 1884. E.E.T.

MORAVIA, a village of Cayuga County, New York, 17 miles S.E. of Auburn, on the Lehigh Valley railroad, and at the inlet of Owasco Lake. It is the shipping-center of a fertile farming region, and has manufactures of farm implements and water-wheels. Population, 1900, 1,442.

MORAVIAN BRETHREN IN AMERICA. The American Moravians consider themselves legitimate successors of the *Unitas Fratrum.* (See Vol. XVI, pp. 837–839.) They claim an unbroken succession of bishops from the apostles, through an Austrian branch of the Waldenses. The first settlement of Moravian Brethren in America was at Savannah, Georgia, in 1735, where it was abandoned five years later, and a new colonization begun at Bethlehem, in the Lehigh valley of Pennsylvania. It is their headquarters and the seat of their theological seminary and college. They also founded Lititz and Nazareth, in the same state, and Salem, in North Carolina, all of which were at first exclusive communal towns, similar to those founded by the renewed Unitas Fratrum in Germany and Great Britain. The principle of exclusivism, which is dying out in Europe, was entirely abandoned in America, the last vestige of it disappearing in 1856. The early history of the Moravian church in America is full of heroic incidents of missionary work among the Indians, and, apart from William Penn, no name figures more conspicuously in the early solution of the Indian problem than that of their distinguished missionary, David Zeisberger, who spent 62 years among the aborigines, establishing towns and villages of his converts.

The American province of the Moravian Church, which is responsible to the Unity's Elders' Conference at Berthelsdorf, Germany, has two divisions, a northern and a southern, each with its own provincial synod. The northern division is divided into five districts, covering convenient territorial limits, delegates from which compose the synod. All the important acts of the synod, however, are subject to the ratification of the Unity's Elders' Conference, including the selection of bishops. Election by "apostolic lot" is no more practiced, except occasionally by special request, in the selection of bishops. Marriages by "lot" were abolished by the General Synod in 1818. In 1895 the northern province comprised 80 congregations, with a total membership of 16,329; contributed $111,276 for church support, and $23,343 for missions, pensions, etc. The southern province reported a total membership of 3,548. The synods meet once in five years. The missionary work of the church, in proportion to its numerical strength, is very extensive. The American province, aided by the Unity's Elders' Conference, sustains missions in Greenland, Labrador, and among the North American Indians in central and southern America and in Alaska, the latter including 9 stations, 12 missionaries, 14 native assistants and some 400 converts. The general missionary work controlled by the parent church in Germany extends to nearly all quarters of the globe. The theological school at Bethlehem has an endowment of $75,000, a six-years' course of study and an average of about fifty students. Four general schools are located at Bethlehem, Lititz and Nazareth, Pennsylvania, and at Salem, North Carolina, respectively. Two weekly papers and a Sunday-school paper are issued from the publishing-house at Bethlehem, and also an American edition of the *Text-Book,* the official year-book of the denomination. See *History of the United Brethren in Christ,* J. Lawrence; *Historical Sketches of Bethlehem and the Moravians,* J. H.

Martin (1873); *Life and Times of David Zeisberger*, E. de Schweinitz (1870).

MORAY, JAMES STUART, EARL OF. See MURRAY, Vol. XVII, pp. 68–69.

MORAY FIRTH. See ROSS COUNTY, Vol. XX, p. 876.

MORAYSHIRE OR ELGINSHIRE. See ELGIN, Vol. VIII, pp. 121–123.

MORDANTS. See DYEING, Vol. VII, pp. 494–495.

MOREA. See GREECE, Vol. XI, p. 74.

MOREAU, GUSTAVE, a French painter; born in Paris, France, April 6, 1826; studied under Picot and in the National School of the Fine Arts; sent a *Pieta* as his first Salon exhibit in 1852. The next year two colossal canvases, *Darius après la Bataille d'Arbelles* and an episode from the *Cantique des Cantiques*, were purchased from him by the French government; he devoted himself henceforth to mythological, religious and historical subjects. In 1888 he was made an Academician, and in 1892 a professor at the School of the Fine Arts. His paintings have been warmly discussed, as their philosophical and literary intentions are as obvious as his qualities and defects as a painter. His *Œdipe et le Sphinx* caused a great sensation at the Salon of 1864. *Orphée déchiré par les Ménades* (1866) is at the Luxembourg. Died in Paris, April 19, 1898.

MOREAU, MATHURIN, a French sculptor; born in Dijon, France, Nov. 18, 1822; studied in Paris under Ramey *fils* and Dumont; in 1848 he made his début at the Paris Salon. He obtained a second medal in 1855, a first medal in 1859, medals at the Paris Expositions of 1867 and 1878, and a gold medal in 1889. Was mayor of Paris in 1885. His style is more graceful than strong, and his works are more frequently busts and statuettes than statues of life or heroic size. Napoleon III bought his *La Fée aux Fleurs*.

MOREHEAD CITY, a town of Carteret County, North Carolina, in the southeastern part of the state. It lies between Bogue Sound and the estuary of the Newport River, opposite the city of Beaufort, is reached by the Atlantic and North Carolina railroad, and in 1900 had a population of 1,379. W.F.J.

MOREL, edible fungus. See MUSHROOM, Vol. XVII, p. 84.

MORELOS, Mexico, a small southern-central state; area, 2,773 square miles. The state was constituted in 1869 and named after the native patriot (see following). It occupies part of the southern slopes of the volcanic Anahuac plateau, Popocatepetl, 17,540 feet high, rising at its northern corner between the states of Puebla and Mexico. It is drained by the river Amacusac, a tributary of the Mescala, and in the warm southern valleys sugar cane and other agricultural products are cultivated; sugar and rum are exported. Cuernavaca, the capital, and Cuautla (q. v.) are the largest cities. Population of state, 1900, 161,700. C.L.S.

MORELOS Y PAVON, JOSÉ MARIA, a Mexican patriot and soldier; born near Apatzingan, Michoacan, Mexico, Sept. 30, 1765. As a youth he worked as a muleteer, and at the age of 31 entered the college at Valladolid. He was ordained to the priesthood three years later and from 1800 to 1810 was in charge of the parishes of Caracuaro and Nucupetaro. In 1810 he joined the insurgent army of negro slaves raised by Miguel Hidalgo, who had been rector of the college of Valladolid during Morelos's student days. In this revolt he rose to great prominence, occupying the position of second in command to Hidalgo. After Hidalgo's death he kept the rebellion alive in the North by his own vigorous movements in the South. Having defeated several Spanish armies he advanced upon the City of Mexico, defeated Porlier, Jan. 22, 1812, successfully held Cuautla for 62 days against the famous siege by the viceroy, and captured Oaxaca in Oct., 1812, and Acapulco in Aug., 1813. He was made captain-general by the Mexican government in Nov., 1813, by the Congress convened at Chilipancingo and the declaration of Mexican independence soon followed. Morelos attempted to capture Valladolid in January, 1814, but was defeated by Iturbide and was captured, conveyed to the capital as a prisoner of war and shot from the rear as a traitor at San Cristobal, near the City of Mexico, December 22, 1815. He was made a popular hero in Mexico and several districts were named in his honor. W.M.C.

MORENCI, a village of Lenawee County, Michigan, in the eastern part of the southern tier of the southern peninsula. It lies 75 miles southwest of Detroit, and is reached by the Wabash and Lake Shore and Michigan Southern railroads. Its population in 1900 was 1,334. W.F.J.

MORES, ANTOINE AMÉDÉE MARIE VINCENT MANCA, MARQUIS DE, a French soldier and adventurer; born in Paris, France, June 14, 1858; son and heir of the Duc de Vallombrosa; graduated from St. Cyr Military School and entered the French cavalry as a lieutenant in 1878; resigned in order to marry the daughter of Banker von Hoffmann of New York in 1880; undertook to organize a company that was to deliver meat straight "from range to stall," and superintended the western terminus of the deal, at Medora, on the Northern Pacific railroad. While there he was tried for the murder of a cowboy in a frontier fight, but was acquitted. The enterprise was abandoned, after costing von Hoffmann $1,000,000. Settling in Paris, he plunged into Socialistic and Jew-baiting schemes, and fought two duels on that account, both times wounding his adversaries severely. Early in 1896 he organized an expedition through the Regency of Tripoli for the purpose of antagonizing the British advances in the Soudan by means of uprisings of Arab tribes. On June 8, 1896, he was murdered by his treacherous allies.

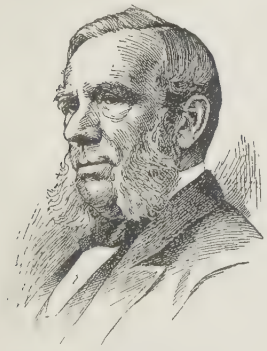
MORESNET, a small, neutral territory, between the boundaries of Prussia and Belgium, 4 miles S.W. of Aix-La-Chapelle. It contains the famous and very valuable zinc mines of the Vieille Montagne, Altberg, the property of a wealthy Belgian corporation. This territory, which was created by the Treaty of Vienna in 1816, and which fixed the limits between Westphalia and the Netherlands, is

70 miles square, and is governed by a burgomaster and a common council. There are also a Belgian township of Moresnet and a Prussian township of the same name, on either side of the independent territory.

MORGAN, Conway Lloyd, an English scientist; born in London, Feb. 6, 1852; graduated at the Royal School of Mines, London; spent five years in South Africa as lecturer on science at Rondebosch, near Cape Town (1878–83); returning to England, he entered Bristol University College as instructor and rose to be its principal. Wrote *Animal Biology* (1887); *Animal Life and Intelligence* (1890); and *Introduction to Comparative Psychology* (1894).

MORGAN, Daniel, an American soldier; born in Hunterdon County, N. J., in 1736. He was originally a farm-laborer, but removed to Virginia, and in 1755 entered Braddock's army as a wagoner. He afterward joined the Continental army, at first in command of a company of backwoods riflemen. He accompanied Arnold's expedition to Quebec and participated in the assault Dec. 31, 1775, but was compelled to surrender. He was offered a colonelcy in the British army, but declined, and on his release, about the end of 1776, he was appointed colonel of an American rifle regiment. He rendered valuable service during Washington's campaigns in New Jersey in 1776–77, and in the latter year joined Gates, taking a prominent part in the campaign that led to Burgoyne's surrender. In 1780 he was appointed brigadier-general and was transferred to the southern army under Greene. In 1781 he defeated Tarleton at the Cowpens, for which he received a gold medal from Congress. He aided in quelling the whiskey insurrection in Pennsylvania in 1794. He was a Representative in Congress from Virginia from 1797 to 1799. He died in Winchester, Va., July 6, 1802. E.E.T.

MORGAN, Edwin Dennison, an American statesman; born in Washington, Mass., Feb. 8, 1811. He engaged in the grocery business at Hartford, Conn., and later in New York. He was a member of the city council in Hartford in 1832; alderman of New York in 1849; member of the State Senate, 1850–53; State commissioner of immigration, 1855–58; chairman of the Republican national committee, 1856–64; governor of New York, 1859–62; major-general of volunteers, 1861–63; United States senator, 1863–69; and chairman of the Union Congressional committee in 1864. As war governor of the Empire State he was indefatigable in raising troops and supporting the Federal cause. In 1881 he declined the position of Secretary of the Treasury offered by President Arthur. He died in New York, Feb. 14, 1883. E.E.T.



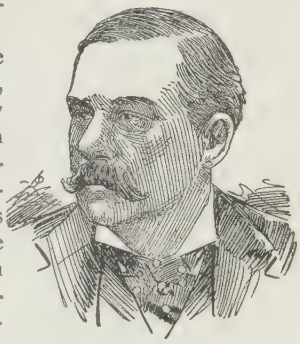
EDWIN D. MORGAN.

MORGAN, Sir Henry John. See Buccaneers, Vol. IV, pp. 367–368.

MORGAN, John Hunt, an American soldier; born in Huntsville, Ala., June 1, 1826. In boyhood he removed with his parents to Lexington, Ky. In the Mexican War he served as a first lieutenant and afterward was a manufacturer in Lexington. In the Civil War he raised a cavalry troop, and became a major-general in 1862, and in 1863 a brigadier-general. In June, 1863, he organized a guerrilla band and made numerous successful raids in Kentucky. Later in the same year he began an extensive raid through Indiana, but was captured and imprisoned in the Ohio penitentiary. He escaped, and headed a fresh raid in Tennessee; but was killed near Greenville, Tenn., Sept. 4, 1864. W.M.C.

MORGAN, Junius Spencer, an American financier and philanthropist; born in West Springfield, Mass., April 14, 1813. He was a clerk in a store until he was 21 years of age, when he removed to New York, and for 18 months was engaged in banking. He then entered the dry-goods trade in Hartford, Conn., where he was junior partner in a leading firm and rapidly advanced until he formed a partnership under the name of J. M. Beebe, Morgan & Co., of Boston, which became one of the largest dry-goods establishments in the United States. In 1854 he went to Europe and became a member of the banking house of George Peabody and Company, in London, which subsequently became J. S. Morgan & Company. Mr. Morgan was well known in charitable and religious work and was a generous benefactor to Trinity College and the Hartford Orphan Asylum. He established a public library in Hartford and made valuable donations to the Metropolitan Museum of Art, Yale College and other institutions. He died in Monte Carlo, Monaco, April 8, 1890. W.M.C.

MORGAN, John Pierpont, an American financier; son of Julius Spencer Morgan (q. v.); born in Hartford, Connecticut, April 17, 1837. He was educated at the University of Göttingen, Germany, and in 1857 became connected with the banking firm of Duncan, Sherman & Company. In 1871 he was made a partner of the firm of Drexel, Morgan & Company, which afterward became J. Pierpont Morgon & Company. He became widely known as an organizer of great monied interests and trust combinations, successfully having control at various times of the New York Central system, the New York, New Haven and Hartford, the Reading, the Erie, the Lehigh Valley, the Southern, the Northern Pacific, the Big Four and the Chesapeake and Ohio railroads. In 1901 he succeeded in organizing the United States



J. PIERPONT MORGAN.

Steel Company, uniting the Carnegie Steel Works and other large concerns with a capitalization of $1,100,000,000, and dominating the steel industries of the United States. This was followed by the Atlantic shipping combination and the several coal trusts. In 1895 he organized the syndicate that took up the United States bonds issued to increase the gold reserve. He has made munificent gifts to hospitals and other institutions. These include $500,000 to the New York Trades Schools; $1,350,000 to the New York Lying-In Hospital; a collection of ancient Greek ornaments valued at $150,000 to the Metropolitan Museum of Art, and $1,000,000 to Harvard College. W.M.C.

MORGAN, JOHN TYLER, an American soldier and statesman; born in Athens, Tenn., June 20, 1824. He removed to Alabama in 1833, received an academic education, and was admitted to the bar in 1845. In 1860 he was presidential elector for the state at large, and in 1861 was delegate from Dallas County to the state secession convention. In May, 1861, he joined the Confederate army as a private, and was later elected major and lieutenant-colonel of the 5th Alabama Regiment. In 1862 he was commissioned colonel and raised the 51st Alabama Regiment, and in 1863 became brigadier-general. After the war he resumed the practice of his profession at Selma, Ala. He has represented his state in the United States Senate since 1877, and was a member of the Bering Sea arbitration commission. E.E.T.

MORGAN, LEWIS HENRY, an American archæologist and anthropologist; born in Aurora, N. Y., Nov. 21, 1818. He was graduated from Union College, studied law in Rochester and was a member of the state legislature in 1861. He published *The League of the Iroquois* (1851); *Houses of the Aborigines* (1881); *The American Beaver* (1868). He died in Rochester, N. Y., Dec. 17, 1881. W.M.C.

MORGANATIC MARRIAGE. See MARRIAGE, Vol. XV, p. 576.

MORGAN CITY, a city of St. Mary's Parish, Louisiana, in the southern part of the state. It lies at the lower end of Grand Lake, and is connected by a deep waterway with Atchafalaya Bay on the Gulf of Mexico, and thus enjoys a large sea-borne commerce. It is also reached by the Southern Pacific railroad. It is an important sugar market and shipping point for the fish and fruit trades, and had in 1900 a population of 2,332. W.F.J.

MORGANFIELD, a town and the capital of Union Co., Kentucky, in the northwestern portion of the state; the town was founded in 1811, and is on the Ohio Valley railroad, 5 miles S. of the Ohio River and 39 miles S.W. of Evansville, Indiana. Tobacco is the leading product of the district. Population, 1890, 1,094; 1900, 2,046.

MORGANTON, a town and the capital of Burke County, northeastern North Carolina, on the Catawba River and the southern railroad, 55 miles W. of Statesville, 64 miles N.W. of Charlotte. Here are situated the State Hospital for the Insane and the State School for the Deaf and Dumb. The region is both an agricultural and a mineral one. Population, 1890, 1,557; 1900, 1,938.

MORGANTOWN, a town and the county seat of Monongahela County, West Virginia, in the northern part of the state. It lies on the eastern bank of the Monongahela River, a few miles south of the Pennsylvania state line, fifty miles southeast of Wheeling, and 100 miles south of Pittsburg, in an agricultural and mineral country. It is reached by the Baltimore and Ohio railroad, is the seat of West Virginia University, a large co-educational institution founded in 1867, and had in 1900 a population of 1,895. W.F.J.

MORILLO, PABLO, a Spanish soldier; born in Fuente, Spain, in 1777. In 1815 he commanded the Spanish forces in South America, where he became notorious for his harsh treatment of the revolutionists. Defeated by Bolivar, he signed the truce of Truxillo, Nov. 25, 1820, and returned to Spain, dying in Madrid in 1838. E.E.T.

MORLEY, HENRY, an English author; born in London, September 15, 1822. He was educated at a Moravian school at Neuwied on the Rhine, and at King's College, London, and for some years was a surgeon at Madingley, in Shropshire. He then tried an experiment in schoolkeeping near Liverpool, and ultimately adopted literature as a profession. In 1857 he became English lecturer at King's College, but gave up this post in 1865 to take the post of professor of the English language and literature at University College. He was one of the editors of Dickens's periodicals, *Household Words* and *All the Year Round;* was for a time editor-in-chief of the *Examiner*, and in 1878 was appointed professor of literature at Queen's College, London. From 1882 to 1890 he was principal of University Hall, London. Among his more important literary works are biographies of *Palissy* (1852); *Jerome Cardan* (1854); *Cornelius Agrippa* (1856); *Clement Marot and Other Studies* (1870); *Journal of a London Playgoer* (1866); *English Writers* (1864–67); *Tables of English Literature* (1870); a *First Sketch of English Literature* (1873), and *English Literature in the Reign of Victoria* in the Tauchnitz edition of British authors (1881); and numerous editions of standard authors; the *Spectator* (1868); *Cassell's Library of English Literature* (1875–81); *The Library of English Literature* (1883); *The Universal Library* (1883), and *The National Library* (1884). He was also the author of fairy tales, *Fables and Fairy Tales* (1860); *Oberon's Horn* (1861), and *The Chicken Market* (1877). He died in Carisbrooke, Isle of Wight, May 14, 1894. W.M.C.

MORLEY, JOHN, an English statesman and author; born in Blackburn, Lancashire, December 24, 1838. He was educated at Cheltenham College, and afterward proceeded to Lincoln College, Oxford, where he graduated in 1859. In 1873 he was called to the bar at Lincoln's Inn, of which he was appointed a bencher in 1891. But while his profession was law, his most ardent

pursuit was literature. He contributed articles and critiques to the *Saturday Review* up to 1867. Then he became editor of the *Fortnightly Review*, which under his editorship became politically argumentative and aggressively radical. As far back as 1869 he endeavored to enter Parliament but was unsuccessful in Blackburn. At the general election of 1880 he was one of the Liberal candidates for Westminster, but was again unsuccessful. Immediately after the election of that year he became more closely identified with practical politics by his appointment as editor of the *Pall Mall Gazette*. From 1883 to 1885 he was editor of *MacMillan's Magazine*. In 1883 he was elected to Parliament from Newcastle-on-Tyne. He soon became a power in the House, and in 1883, presided over the Leeds Conference, at which it was decided to urge the government to introduce a Franchise Bill in the following session. He was chief secretary for Ireland during Gladstone's short ministry in 1886, and again during the Gladstone-Roseberry administration, from 1892 to 1895. He was re-elected to Parliament from Montrose in 1901. His first published work was *Edmund Burke, a Historical Study* (1867); and his subsequent writings comprise *Critical Miscellanies* (1871); *Voltaire* (1871); *The Struggle for National Education* (1873); *Rousseau* (1873); *On Compromise* (1874); a collection of five vigorous essays; *Diderot and the Encyclopædists* (1878); *Burke* (1879), in the series of English Men of Letters, of which he was general editor; *Life of Richard Cobden* (1881); *The Study of Literature* (1887); *Aphorisms* (1888); *Walpole* (1889); *Studies in Literature* (1891); *Oliver Cromwell* (1900), and *Life of Gladstone* (1903). In politics he is a pronounced radical and consistently in favor of Home Rule for Ireland and on non-intervention in European affairs. Since 1894 he has been a trustee of the British Museum. He received degrees from Glasgow University in 1879 and from Cambridge in 1892.

JOHN MORLEY.

W.M.C.

MORLEY, SAMUEL, an English merchant and philanthropist; born in London, England, Oct. 15, 1809; succeeded his father as a prosperous manufacturer of hosiery; was a strong agitator in favor of total abstinence, and a zealous Congregationalist. He was returned to Parliament for Nottingham as a Liberal in 1865; was unseated on petition; represented Bristol from 1868 to 1885, and declined a peerage which was offered to him in the latter year. He donated a large portion of his wealth to religious and philanthropic undertakings. He died near Tonbridge, Sept. 5, 1886.

MORMONS. See Vol. XVI, pp. 852–855; and LATTER-DAY SAINTS, in these Supplements.

MORNING-GLORY FAMILY, a name sometimes applied to the family *Convolvulaceæ* on account of its most prominent genus, *Ipomœa*, whose species are the true morning-glories. Besides the morning-glories the family contains the bindweeds (*Convolvulus*), the curious parasitic twiners known as dodders (*Cuscuta*), and several other genera not so popularly known.

MOROCCO. Since 1892 this semi-barbarous sultanate has had repeated troubles with European powers, reminding one strongly of the incidents that preceded the conquest of Algeria by the French in 1830. In 1892 an English envoy was dismissed curtly by Sultan Mulai-Hassan, who showed open preference for the French consul-general. In 1893 British iron-clads were sent to the coast of Morocco, but were not called upon to act. The forts of Ceuta and Melilla, on African soil, are occupied by Spanish troops; the latter position was attacked Oct. 2, 1893, by 6,000 insurgent Moors, generally known as "Riffians," who were repulsed with heavy losses. The Sultan offered to make full reparation and to grant further territory around the forts, but proved totally unable to cope with the insurgents, who increased in number and began a regular siege of Melilla. In spite of the rather threatening attitude of England, intent upon a non-intervention policy on the part of Spain, the Madrid government, feeling that its prestige and the security of its African possessions were at stake, sent troops and supplies, first for a defensive campaign, and later for an occupation of the Riffian villages. Finally, the Spanish forces having increased to 24,000 men under Marshal Martinez Campos, the Sultan recognized anew his liability for the losses incurred, and on March 5, 1894, pledged himself by treaty to pay Spain an indemnity of $4,000,000 and to remove the troublesome tribes from the vicinity of the Spanish possessions. On June 6, 1894, Sultan Mulai-Hassan died suddenly, under suspicious circumstances, and his 15-year-old son, Mulai-Abd-el-Aziz, was proclaimed sultan in the Sherifian camp, and the government was recognized by the powers before the indemnity had been paid. Mulai-Abd-el-Aziz died Aug. 12, 1898. Fez is the capital; pop. 140,000.

MOROCCO LEATHER. See LEATHER, Vol. XIV, pp. 388–389.

MORPHOLOGY (in plants). The present article is intended to give a brief and popular outline of the morphology of the plant kingdom upon the basis of its evolution, and for fuller and more technical details refers to the articles on BOTANY, MORPHOLOGY, and REPRODUCTION.

Morphology considers not merely the form and structure of the mature plant-body and its organs, but also the development of these structures. This latter phase, often referred to as *embryogeny*, is essential to an understanding of the homologies, and is of fundamental service in phylogeny. As modifications of structure imply adaptation to function, it is impossible to consider morphology entirely apart from physiology.

The fundamental fact of morphology is the existence of a living substance, called *protoplasm*,

which constitutes the real living body of every plant. This protoplasm may not develop any structure about itself, as in certain phases of the "slime-moulds"; but ordinarily it occurs in very small masses, separated from each other by membranes which the protoplasm has constructed, and which organize the plant-body into an aggregation of *cells*. The plasmic mass in each cell usually is not completely isolated from its fellows, but exceedingly delicate threads of protoplasm often pass through perforations of the cell-wall and bring into living connection neighboring plasmic masses. This is known as "continuity of protoplasm," and organizes the whole plant into a single living body. All plant-bodies originate from a single cell, which usually has a cell-wall. This single cell may represent the whole structure of the mature form, and there are many plants which are spoken of as "one-celled" (unicellular). The "many-celled" (multicellular) forms, however, are more common, and these, having begun as a single cell, by cell-division and cell-growth develop to the mature form and size. Multicellular plants, therefore, are aggregations of cells, which, in the lower plants, are but repetitions of each other, each cell being a duplicate of every other in form and power. Among higher plants, however, the cells do not all remain alike, but adapt their forms more specially to the various functions, so that different kinds of cell-aggregates appear, known as "tissues." This differentiation of tissues reaches its extreme expression in the highest plants, whose bodies are exceedingly complex, and are capable of performing a great variety of functions, in a far more perfect way than can those plants in which all the functions must be carried on by a single cell. In this specialization of cell-form and cell-work, however, some fundamental powers have been lost, notably the power of reproduction, which is confined to cells of more primitive form. The cell has thus come to be regarded as the morphological unit of the plant, and it is convenient to regard it as such at present, although subsequent researches may necessitate a change of statement. Since, in the largest sense, the whole work of the plant may be divided into *nutritive* and *reproductive*, the evolution of plants is concerned with two sets of organs, the nutritive or "vegetative organs," and the "organs of reproduction," the former constituting the plant-body, the latter including those specialized organs set apart for reproduction. In the following account, these two lines of evolution will be followed only in their main facts, all specially modified groups and structures being left to the regular text-books.

The *Thallophytes* represent the lowest of the four great groups of plants at present recognized. At the lowest limits of this group are to be found the simplest plants, and from the standpoint of evolution the most primitive forms. The great series of Algæ, or "sea-weeds," characterized by containing chlorophyll, shows the gradual modification of plant-structure from its simplest phases to forms of great complexity. The evolution of the plant-body in Algæ may be outlined as follows: The lowest forms consist of a single spherical cell, which multiplies itself by cell-division, each individual being thus replaced by two new ones. In some cases this cell-multiplication results in cell-aggregates, arranged in a continuous row or filament, or in a plane, or in a mass, all held together by their more or less mucilaginous cell-walls. In this case, however, the multicellular form is a colony of independent, undifferentiated cells. In higher forms the multicellular filament, etc., shows more of an individual character and the beginning of differentiation. In a filament, for instance, the two ends may differ somewhat from each other; or the one may develop as a hold-fast, the other as the vegetative part of the plant-body, indicating the primitive division of the body into "root" and "shoot." These undifferentiated forms have the plant-body known as the "thallus," which gives name to the whole group. In many cases a filamentous body develops further complexity by branching, the branches simply repeating the structure of the main axis. Besides the filamentous forms there are those which are spherical and those which are flattened expansions, the latter being especially common among the true sea-weeds. Among the higher sea-weeds there is frequent a still greater differentiation of the plant-body, not only a distinction between root and shoot being apparent, but the shoot showing a complete differentiation of stem and leaf (*Sargassum*, etc.). In these cases the three primary vegetative organs—root, stem and leaf—are represented, and there is in addition a certain amount of cell-differentiation, but not decided enough to result in distinct tissues. Among the Algæ, therefore, plant-bodies begin with unicellular forms; include multicellular forms showing a differentiation into root, stem and leaf, but no marked tissue differentiation; and display every intermediate gradation of complexity. Even more striking among Algæ is the evolution of the reproductive organs. In the low unicellular forms, there are no special organs for reproduction, the multiplication of the species being secured by simple cell-division. In somewhat higher forms the beginning of specialized reproduction appears in the formation, by "internal cell-division," of certain specialized cells whose function is to reproduce the plant. These cells have received the general name *spore*. The spores escape from the cell which produces them (the "mother-cell"), and if the surrounding medium is water, as is generally the case among Algæ, they usually have the power of swimming by means of cilia. These motile spores, called "zoöspores," have the power of producing another plant like the parent. In the formation of spores the ordinary vegetative cells are utilized at first, but with further differentiation special cells are set apart for this work, called *sporangia* or "spore-cases." Besides reproduction by ordinary cell-division and by spores, the Algæ present still another kind of reproduction, known as the

"sexual." The sexual method and the method by spores (non-sexual) usually co-exist in the same plant, but the sexual has evidently been derived from the non-sexual. The essential structures connected with sexual reproduction are the formation of two specialized cells, *gametes*, which are incapable of further development, but which unite to form a third cell, the *oöspore*, which has all the powers of reproduction which belong to the ordinary spore. It seems to be quite certain that gametes have developed from zoöspores. In fact, in such an alga as *Ulothrix*, zoöspores of different sizes are formed, the larger ones capable of reproduction, the smaller ones often incapable, but upon coalescence in pairs the resultant cell can reproduce. These reduced zoöspores are gametes, and their union is a sexual act; and the *Ulothrix* represents plants in which the two methods of reproduction, sexual (by gametes) and non-sexual (by spores), are beginning to differentiate. In these primitive stages of sexual reproduction the two gametes show no differences in form or size or activity; but with the increasing differentiation of plants they gradually come to be more and more unlike, one increasing in size and gradually becoming passive, the other diminishing in size but increasing in activity. When the gametes have thus become distinct from each other, the large passive one is called the *oösphere*, and the smaller, active one the *spermatozoid* or *antherozoid*, otherwise the female and male cells. At their first appearance, gametes are not only alike in appearance and action, but their "mother-cells" are the ordinary vegetative cells of the plant. Later, special cells are set apart to produce them, and when the gametes have become sexually differentiated these special cells, the sex-organs, are known as the *oögonium* (producing the oösphere) and the *antheridium* (producing spermatozoids). For convenience, the coalescence of similar gametes is called *conjugation*, and the resultant reproductive cell a *zygospore;* while the union of oösphere and spermatozoid is called *fertilization*, and the resultant cell an *oöspore*. The life-history of an ordinary alga, therefore, is as follows: A vegetative body of similar cells begins to produce spores, each of which develops another vegetative body; this non-sexual reproduction continues for a certain time, resulting in an extensive multiplication of the plant; later (usually toward the close of the growing season) gametes are developed, which by their union form oöspores; the oöspores usually have a heavy protective coat and persist until the next growing season, in the meantime all the vegetative plants perishing; at the beginning of the next growing season the oöspores germinate and develop new plants, which, beginning to reproduce by ordinary spores, rapidly multiply again.

Besides the Algæ, the Thallophytes contain the great parallel group of Fungi, plants which contain no chlorophyll and hence must live as parasites or saprophytes. The Fungi also begin with one-celled forms, such as bacteria, and include forms of considerable complexity, such as mushrooms. In many of their forms they so closely resemble Algæ that they are regarded as having been derived from them, although among the higher fungi such a relationship is by no means evident. Originally chlorophyll-bearing and independent, their parasitic or saprophytic habit has entailed modifications of structure in the higher forms, having led often to a complete disappearance of sexual organs. From the standpoint of the evolution of the groups above Thallophytes, the Fungi are of no importance, the line of advance being through the Algæ. As degenerate and often highly modified Algæ, therefore, the Fungi may be dismissed from the present discussion with this brief mention; although from the economic standpoint, as prolific sources of plant and animal diseases, as active in many important processes, they are of very great importance.

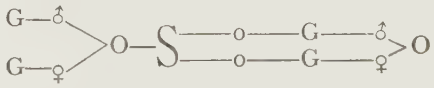
In the second great group of plants, the *Bryophytes* (liverworts and mosses), a more complex morphology is met. The important phenomenon known as "alternation of generations" here becomes plainly exemplified, having been indicated to some extent among the higher Algæ. It represents a more distinct separation of the sexual and non-sexual work of the plant. In Algæ the same plant produces spores and gametes, but in Bryophytes the plant which bears gametes has lost the power of producing spores, a condition which has been brought about by the development of a new structure. The oöspore, formed by the coalescence of gametes, does not produce a plant like the one from which it came, as is the rule among Algæ, but develops a very different and quite independent structure. This new structure, in turn, produces spores, each of which, upon germination, develops the original gamete-bearing plant. Thus two phases or generations alternate with each other, mutually producing each other, but not, except occasionally, reproducing themselves. The phase producing gametes is called the *gametophyte*; that producing spores, the *sporophyte*. Among the Bryophytes the gametophyte does the chief vegetative work of the plant, and therefore is the more conspicuous phase, being commonly spoken of as "the plant"; while the sporophyte is represented by the complex "spore-case" and its usually elongated stalk, the whole structure being often called "the fruit" of the moss, although morphologically it holds no relation to the fruit of higher plants. The gametophyte of Bryophytes presents a peculiarity of structure in that it consists of two very dissimilar parts. The spore upon germinating first develops a branching structure, which is usually filamentous and alga-like, known as the *protonema*, and as lateral buds on this protonema the adult shoots or leafy moss-plants arise. The gametophyte, therefore, is made up of protonema and adult shoots. The life-history of a Bryophyte is as follows: The gametophyte, with the vegetative structure just described, develops sexual organs, *antheridium* and *archegonium*, the latter being a many-celled, flask-shaped organ, whose more or less elongated neck develops a passage-way for

the spermatozoids to reach the oösphere; the oöspore, formed by the coalescence of spermatozoid with oösphere, develops the sporophyte, a structure consisting of a spore-case and its stalk, but developing no vegetative organs; the spores developed by the sporophyte upon germination produce the gametophyte. The life-history formula is written as follows:

in which G stands for gametophyte, ♂ and ♀ for male and female gametes, O for oöspore, S for sporophyte and o for spore.

Not only does the plant-body of Bryophytes show a distinct differentiation of the vegetative organs (root, stem and leaf), but the stems of both sporophyte and gametophyte display a distinct differentiation of tissues. A cross-section of the stem shows an outer region of thick-walled cells, which give a certain amount of rigidity, representing the tissue known as *sclerenchyma;* within is a zone of primitive thin-walled cells, known as *parenchyma;* while in the center there often occurs an axial strand of small and elongated parenchyma cells, set apart as conducting tissue, and in higher plants to differentiate completely into the important tissues of the vascular region. The leaves of Bryophytes are very simple, consisting of a single lamina of cells; while the roots of the gametophyte are simply hair-like organs called *rhizoids.* The sporophyte develops a root-structure, called the *foot,* which is thrust into the gametophyte as a hold-fast and organ of absorption. In reference to phylogeny, the liverworts (*Hepaticæ*) seem to have been derived from the Algæ, and to have given rise to the Pteridophytes above, while the mosses (*Musci*) have arisen from them as a specialized and divergent branch.

The *Pteridophytes* (ferns, horse-tails, club-mosses) form the third great division of plants, and, while associated with the Bryophytes in certain important characters, show decided advances. The alternation of generations is still more marked in the true ferns, for the gametophyte and sporophyte phases are not only distinct but independent plants. A notable change, however, is seen in the transference of the chief vegetative work to the sporophyte, which in Bryophytes was done by the gametophyte. In the Pteridophytes, therefore, "the plant," that is, the prominent leafy phase, is the sporophyte. Instead of developing elaborate capsules, as in mosses, the fern sporophyte develops numerous sporangia usually upon the under surface of its leaves. The gametophyte is usually a small, flat, thallus body, called the *prothallium,* sometimes containing chlorophyll, sometimes entirely subterranean. The prothallium bears antheridia (containing spermatozoids) and archegonia (containing an oösphere), and from the fertilized oösphere (oöspore) the leafy sporophyte arises, the spores developed on the sporophyte leaves in turn producing prothallia (gametophytes). While the vegetative body of the gametophyte is simple and primitive, the sporophyte presents a high degree of differentiation in all the vegetative organs. The elaboration of the *vascular* or woody system makes possible a much more complex development of these organs. While this system provides for extensive conduction, the rigidity necessary for plants which sometimes become trees is mainly supplied by a very large development of sclerenchyma. The vascular system is differentiated into fibrous, tracheary and sieve tissues, while the sclerenchyma and primitive parenchyma continue. The most significant morphological fact connected with Pteridophytes, however, is the appearance of *heterospory,* associated with a great reduction of the gametophyte. In the genera *Isoetes, Salvinia, Azolla, Marsilea, Pilularia* (belonging to ferns) and *Selaginella* (belonging to club-mosses) heterospory is distinctly presented. It signifies that the sporophyte produces two kinds of spores, different in size, hence called *macrospores* and *microspores,* the former developing a prothallium (gametophyte) which bears archegonia, the latter a prothallium which bears antheridia. Thus the gametophytes are sexually differentiated, and this differentiation extends to the spores which produce them. With the appearance of these differentiated spores the gametophytes are reduced in size, and finally do not leave the spores which develop them, although more or less exposed or extruded through the rupturing or dehiscence of the spore-walls. The life-history formula of a heterosporous Pteridophyte is as follows:



The fourth and highest group of plants is made up by the *Spermatophytes* (often written *Spermaphytes*), also known as the Phanerogams or flowering plants. In this group the vegetative organs and the tissue systems become still more elaborated, and an exceedingly complex and diverse nutritive mechanism is shown. Alternation of generations is also present, but it is disguised very much by the great reduction of the gametophyte, which is no longer independent, but lives as a parasite upon the highly organized sporophyte. Heterospory, also, is universal, and the concealment of the gametophyte has led to the long current conclusion that the macrospores and microspores are sexual cells, and the organs which produce them (stamens and pistils) are sexual organs. The terminology of the flowering-plants is full of this idea, such terms as "male" and "female flowers," "hermaphrodite flowers," "monœcious," "dicœcious" and "polygamous" plants, etc., all implying this erroneous notion of sex. The whole visible plant is a sporophyte. The stamens and pistils (better, "carpels") are leaves modified to produce microsporangia and macrosporangia, homologous with the sporangia borne on the leaves of ferns. The cluster of microsporangia (usually four in number) forms the anther; while the contained pollen-grains are microspores. The carpels (making up the pistil)

are leaves modified to bear the macrosporangia, which have received the name *ovules*. In these macrosporangia usually but one macrospore develops, called "embryo-sac" in the older terminology of flowering-plants. The microspore (pollen-grain) germinates, forming a structure of two or more cells, which represents the male gametophyte. One of the cells of this gametophyte develops a remarkable organ known as the "pollen-tube," which carries the male gamete to the female gamete. The development of this tube is one of the notable features of flowering-plants. In the Bryophytes and Pteridophytes the male gamete is an active spermatozoid, swimming to the female gamete through a watery medium. In flowering-plants, however, the watery medium is lacking; the gamete is no longer a spermatozoid, but is carried and guided to the oösphere by a special tube. The macrospore (embryo-sac) is peculiar in the fact that it is not "shed" by the sporangium which produces it, but is permanently retained. In this position it germinates, producing within itself a group of seven or more cells, which represent the female gametophyte. At least three of these cells are female sex-cells; but only one of them is capable of fertilization, and hence is called the oösphere. Upon fertilization by the male gamete brought by the pollen-tube, the oösphere becomes the oöspore, which then develops the embryo of the new sporophyte. The great morphological feature of Spermatophytes, as the name implies, is the production of the structure known as the "seed." This is made possible by the retention of the macrospore in the sporangium (ovule) which produced it; and by the further retention of the female gametophyte and the consequent formation of the sporophyte embryo within the macrospore. Consequently, the morphology of the seed is very complex. It consists of (1) portions of the old sporophyte, represented by the outer parts of the seed, (2) the gametophyte, represented by the "endosperm," formerly called the "albumen," and (3) the embryo of the new sporophyte. The development of the "flower," also somewhat characteristic of the group, follows from the same chain of causes. In order to make possible the transfer of the male to the female gamete by the development of a tube by the male gametophyte, the microspore (pollen-grain) which produces the male gametophyte is transferred from its sporangium to the leaf (carpel) in connection with which the female gamete is developed. This transfer of the pollen has led to the great problem of pollination, worked out elaborately and variously by the flowering-plants, in the modification and grouping of other specialized leaves, especially in the way of fragrance, "irregularity," etc., in relation to insects as agents of the transfer, all combining to render the "flower" endlessly diverse.

The description of Spermatophytes given above applies more strictly to the Angiosperms. The Gymnosperms (pines and their allies) are intermediate in almost every particular between the Angiosperms and Pteridophytes, developing a many-celled female gametophyte with numerous archegonia, having the macrosporangia (ovules) exposed, and the pollen-grains brought in direct contact with them, and a consequent small development of pollen-tube. In the Cycads the resemblance to Pteridophytes is still more striking. So far as the phylogeny of Spermatophytes is concerned, they seem to have descended from the heterosporous Pteridophytes, with probably the ancestral forms represented in the flora of to-day most nearly by such a group as Isoetes.

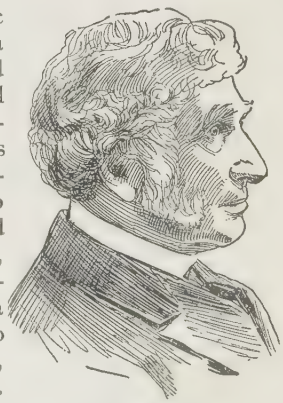
In brief summary, the salient facts in the morphological development of the plant kingdom are: Sexless plants, the evolution of sex from the sexless spores, the evolution of bisexuality, the alternation of generations, the sporophyte differentiating from the gametophyte, the appearance of heterospory, the gradual reduction of the gametophyte, the retention of the macrospore and consequent development of the seed.

JOHN M. COULTER.

MORPHOLOGY OF BACTERIA. See BACTERIOLOGY, in these Supplements.

MORPHY, PAUL CHARLES, an American chess-player; born in New Orleans, La., June 22, 1837. At the age of 12 he defeated many local amateur players, and in 1857 at the first American chess congress held in New York, he defeated his strongest opponents. He went to Europe in 1858 and astonished the world by defeating the champions of England, France and Germany. He returned to New Orleans in 1859, but his health being impaired he abandoned all intellectual work. He died in New Orleans, July 10, 1884. W.M.C.

MORRILL, JUSTIN SMITH, an American statesman; born in Strafford, Vt., April 14, 1810. He received a common-school and academic education; became a merchant; and afterward engaged in agricultural pursuits. He was a Representative in Congress from Vermont from December 3, 1855, to March 3, 1867, and senator from March 4, 1867, till his death, having been elected as a Union Republican to succeed Luke P. Poland, also a Union Republican. He was a regent of the Smithsonian Institution, prominent in tariff legislation, and was the author of a bill which bears his name. He died in Washington, D. C., December 28, 1898.



JUSTIN S. MORRILL.

E.E.T.

MORRILL, LOT MYRICK, an American statesman; born in Belgrade, Me., May 3, 1813. He was educated at Waterville College, Me., and studied and practised law; was a member of the State legislature in 1854 and 1856, and was presi-

dent of the Senate the last year. He was governor of Maine from 1858 to 1860; was elected a United States senator from Maine as a Republican (to fill the vacancy created by the election of Hannibal Hamlin to the Vice-Presidency) and took his seat Jan. 17, 1861; was re-elected in 1863; was appointed in December, 1869, and afterward elected by the legislature to fill the vacancy occasioned by the death of William Pitt Fessenden; was re-elected as a Republican in 1871, and served until July 7, 1876, when he became Secretary of the Treasury (succeeding Charles F. Conant) until March 8, 1877, in which year he was appointed collector of customs at Portland, Me., by President Hayes. He died in Augusta, Me., Jan. 10, 1883. E.E.T.

MORRILLTON, a city and the county seat of Conway County, Arkansas, in the central part of the state. It lies on the north side of the Arkansas River, 39 miles northwest from Little Rock, and is reached by the St. Louis, Iron Mountain and Southern railroad. It is in an agricultural and lumber region, and has some cotton mills. Its population in 1900 was 1,707. W.F.J.

MORRIS, a city and the county seat of Grundy County, Illinois, in the northeastern part of the state. It lies on the Illinois River, the Chicago Drainage canal, and the Chicago, Rock Island and Pacific railroad, 53 miles southwest of Chicago. It has extensive coal mines and iron foundries and machine shops, with other manufacturing industries, and is the center of an important agricultural region. It has a large trade in wheat and corn, lumber, bricks and tile. It is the seat of a normal school and several academies. Its population in 1900 was 4,273. W.F.J.

MORRIS, a village and the county seat of Stevens County, Minnesota, in the western part of the state. It lies on the Pommedu Terre River, 137 miles west by north from Minneapolis, in a farming region, at the intersection of two lines of the Great Northern railroad, and is a favorite resort because of the lakes which cluster about it. Its population in 1900 was 1,934. W.F.J.

MORRIS, Clara, an American actress; born in Toronto, Canada, in 1848. While a baby she was taken to Cleveland, Ohio, and she first appeared on the stage there as a member of the *corps de ballet* in the Academy of Music in 1861. In 1869 she took a leading position at Wood's Theatre in Cincinnati, and in 1870 became a member of Daly's Fifth Avenue company, New York. She quickly rose to the rank of a star. She is celebrated for her emotional *rôles*, which include "Camille," "Miss Moulton," "Mercy Merrick," etc. She has written several books, including *A Silent Singer; My Little Jim Crow; Life on the Stage; A Pasteboard Crown; Stage Confidences*, etc. Her personal reminiscences, published in 1903, are exceedingly interesting.

E.E.T.

MORRIS, George Pope, an American poet; born in Philadelphia, Pa., Oct. 10, 1802. Removing to New York, he began writing for the papers, and for nearly 20 years he conducted the *New York Mirror*, continuing that publication in the *New Mirror* and the *Evening Mirror*. In 1845 he started *The National Press*, the title of which was changed to *The Home Journal*. Mr. Morris is perhaps best known as the author of "Woodman, Spare that Tree!" "Land-Ho!" "Long Time Ago!" "Whip-poor-will," etc., and as the editor (conjointly with Nathaniel Parker Willis) of *American Melodies*. He died in New York, July 6, 1864.

E.E.T.

MORRIS, George Sylvester, an American author; born in Norwich, Vt., Nov. 15, 1840. He was graduated from Dartmouth College in 1860 and at the outbreak of the Civil War served a year in the Federal army. He studied in Europe from 1866 to 1868 and from 1870 to 1880 was professor of modern languages at the University of Michigan. During the next five years he lectured on philosophy and ethics at Johns Hopkins University. He published *British Thought and Thinkers* (1880); *Kant's Critique of Pure Reason: a Critical Exposition* (1882); *Hegel's Philosophy of the State and of History* (1887). He died in Baltimore, Md., in June, 1889.

W.M.C.

MORRIS, Gouverneur, an American statesman; born in Morrisania, N. Y., Jan. 31, 1752. He graduated at King's College in 1768, and was admitted to the bar in 1771. In May, 1775, he was elected a delegate to the New York Provincial Congress, of which he continued a member for nearly three years. He was also a member of the committee for drafting a State Constitution. In 1777 he was elected to the Continental Congress, and spent the winter of that year at Valley Forge as one of a committee to examine the state of the army. In 1780 he underwent the amputation of a leg as the result of a carriage accident. In 1781 he was chosen by Robert Morris as assistant superintendent of finance, which office he held for three years and a half. After the Revolution he resumed the practice of law and engaged with Robert Morris in mercantile speculation. He was a member of the Constitutional Convention in 1787; minister to France, 1792–94; United States senator from New York from May 3, 1800, to March 3, 1803; and was appointed chairman of the canal commission in 1810. He died in Morrisania, November 6, 1816.

E.E.T.

MORRIS, John Gottlieb, an American clergyman and author; born in New York City, Nov. 14, 1803. He was graduated from Dickinson College in 1823, and studied theology at Princeton and Gettysburg seminaries. He was licensed to preach in the Lutheran Church in 1826 and in that year founded the first Lutheran Church in Baltimore, Md., where he remained in charge until 1860. He was one of the founders of the town of Lutherville, Md., where he organized a college for girls and young women. From 1834 until his death he was natural history lecturer at the Pennsylvania College, and he also lectured in the

Smithsonian Institution at Washington. He was especially interested in the study of entomology and microscopy, and was an esteemed member of the American Association for the Advancement of Science and various other learned societies. He founded the *Lutheran Observer* in 1831, which he edited until 1833. Among his publications are *Catechumens* (1853); *Popular Exposition of the Gospel* (1840); *Quaint Sayings and Doings Concerning Luther* (1859); *Catalogue of the Lepidoptera of North America* (1860); *The Lords Baltimore* (1874); *Fifty Years in the Lutheran Ministry* (1878); *Augsburg Confession and the Thirty-nine Articles* (1879); *Memoirs of the Stork Family* (1886). He died in Lutherville, Md., Oct. 10, 1895. W.M.C.

MORRIS, Lewis, an American patriot; born in Morrisania, N. Y., in 1726. He graduated at Yale in 1746 and engaged in farming. He vehemently opposed the compulsion placed on the inhabitants of the Province of New York to support the foreign troops quartered on them. He was elected to the Congress of 1775, and represented New York therein until 1777, and was a member of the committee to devise means for supplying the colonies with munitions of war. After the close of the session he was sent west to detach the Indians from the British. In 1776 he resumed his seat in Congress, and signed the Declaration of Independence, although his estate was at that time in the hands of the enemy. As a consequence his manor was laid waste, and his family expelled. Later he served in the New York legislature. He died in Morrisania, January 22, 1798. E.E.T.

MORRIS, Sir Lewis, an English poet; was born in 1833, at Carmarthen, Wales. He studied at Sherborne Grammar School, Dorset, and then entered Jesus College, Oxford, where he devoted himself to the study of the classics. In 1858 he was called to the bar, and practiced chiefly as a conveyancing counsel until 1881, when he accepted the honorary secretaryship of the University College of Wales, and afterward became treasurer. He was as an active and ardent Gladstonian, and acted for a time as vice-chairman of the political committee of the Reform Club. He also served, in 1880, on the departmental committee charged by the government to inquire into intermediate and higher education in Wales. He was better known as an extensive contributor to the poetical literature of the time. In 1871–75 he published three series of *Songs of Two Worlds*, since collected in a twenty-fifth edition. These were followed in 1876–77 by a still more popular work (39th ed.), *The Epic of Hades*, "a lurid drama, in verse, of the unseen world and the punishment and purgation of spirits," and in 1878 by a drama in monologue entitled *Gwen*. After these the poet published *The Ode of Life* (1880); *Songs Unsung* (1883); *Gycia*, a tragedy written for the stage (1886); and *Songs of Britain* embodying several Welsh legends, and with which is included the *Ode on the Queen's Jubilee*, written by request, owing to the illness of the Laureate, Tennyson (1887). In acknowledgment of the latter, Morris received from her Majesty the jubilee medal, and in 1895 was knighted. In 1890 a volume of the poet's collected works appeared, together with *A Vision of Saints*, which, "proceeding after the manner of Dante, attempts for the Christian ideal what *The Epic of Hades* did for the pagan world." His later writings embrace *Songs Without Notes* (1894), and odes on the death of the Duke of Clarence, on the opening of the Imperial Institute, London, and on the marriage, in 1893, of the Duke of York with the Princess Mary of Teck. *Revised by* R.W.C.

MORRIS, Philip Richard, an English painter; born at Devonport, England, Dec. 4, 1838. While working in his father's foundry he gave his spare time to the study of painting, and finally entered the schools of the Royal Academy, London, where, in 1858, he was awarded a gold medal for his *Good Samaritan* and obtained a traveling studentship; studied in France and Italy; elected an associate Royal Academician in 1877. Among his leading canvases are *The Shepherd of Jerusalem; The Mowers; The Sailor's Wedding; The Fête-Dieu in Dieppe; Sons of the Brave;* and many excellent portraits.

MORRIS, Richard, an English philologist; born in London, September 8, 1833. He was educated at Battersea College; was prepared for the ministry and was given orders in the Church of England in 1871. He then became curate of Christ Church, Camberwell. He was head master of the Royal Masonic Institution for Boys in 1875 and for some years was lecturer on English literature at King's College. He published *The Etymology of Local Names* (1857); *Specimens of Early English* (1867); *Historical Outlines of English Accidence* (1872); edited Chaucer's *Canterbury Tales* (1873); and wrote *The Survival of Early English Words* (1876), and *Folk Tales of India* (1884). He died in Essex, England, May 12, 1894. W.M.C.

MORRIS, William, English poet, art-worker, and socialist; born March 24, 1834, at Walthamstow, and died at Hammersmith, Middlesex, Oct. 3, 1896. He was educated at Marlborough and Exeter Colleges, Oxford. For a time he studied painting and turned his attention to architecture, but afterward devoted himself to literature, varied by an active career in the manufacture of art-fabrics, wall-papers and stained glass. In the latter enterprise he was joined by Dante G. Rossetti, Burne-Jones and Ford Madox Brown, who held with him that not only "executive handicraft was within the province of an artist, but that all crafts demanded artistic treatment." In the

WILLIAM MORRIS.

factory at Surrey, Morris worked as a designer of house-decorations, which proved not only a profitable undertaking, but contributed to reform public taste in color and design. In later life, the poet also took a keen interest and manifested a lively enthusiasm in the Kelmscott Press, near by his home, from which he issued a series of artistic reprints of early English authors, made attractive, mechanically, by his exquisite taste. Morris's literary career began in 1856 with the publication of *The Defence of Guinevere, and Other Poems*, a series of lyrics, mediæval as to matter, tone and color, which have since appealed with increasing delight to readers of imaginative tastes. This was followed in 1867 by a long narrative poem, entitled *The Life and Death of Jason*, and in 1868–70 by *The Earthly Paradise*, a collection of classical and mediæval stories in verse, having much the same sort of setting as the *Canterbury Tales* of Chaucer. His treatment, in *The Earthly Paradise*, of legendary tales, which he represents as recited by Norwegian mariners while they sail westward in quest of the earthly paradise, confirmed their author's rank as a poet, though their dreamy, melancholy mood seems alien to the breeziness and active vigor of the old Vikings. His later verse includes *Love is Enough; or, the Freeing of Pharamond* (1873); *The Story of Sigurd the Volsung; The Fall of the Niblungs* (1876); and translations into English verse of Virgil's *Æneid* and Homer's *Odyssey*. Besides this varied work, together with some prose translations from the Icelandic, and a rendering of the Anglo-Saxon epic of *Beowulf*, Mr. Morris published in 1882 a number of lectures on art topics, the chief of which is *Hopes and Fears for Art*, and also a collection of essays on socialism, of which he was a propagandist, entitled *Signs of Change* (1888). His recent writings include *Poems by the Way* (1892); *The Well at the World's End* (1896); and some translations of Icelandic Sagas, undertaken in collaboration with Eirikr Magnûsson, and two prose romances, steeped, if the term may be allowed, in the poetry of socialism, *News from Nowhere* and *A Dream of John Ball*. Happily, his verse is untainted by his later economic opinions and socialistic doctrines, and remains to translate the reader of it from the hard, material world about him to "the beautiful garden of dreams."

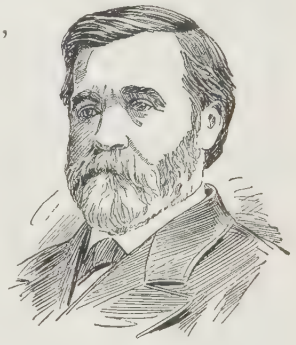
G. Mercer Adam.

MORRISBURG, Canada, a town of Dundas County, Ontario, on the St. Lawrence River, opposite Waddington, N. Y., U. S. A., and on the Grand Trunk railway, 90 miles west of Montreal. It is a port of entry with an export trade in grain, market produce, and live cattle, and manufactures flour, lumber, building materials, and agricultural implements. Population, 1901, 1,693. C.L.S.

MORRIS ISLAND, a small, sandy island at the southwest side of the entrance to Charleston Harbor, South Carolina, separated from James Island by a narrow tidal creek. Its northern extremity, Cummings Point, is the nearest land to Fort Sumter. Early in the Civil War the island was strongly fortified by the Confederates, as one of the defences of Charleston, but it was attacked by the Federal forces and by a memorable capture of Fort Wagner, on July 18, 1863, the whole island fell into Federal hands. W.F.J.

MORRISON, a city and the county seat of Whiteside County, Illinois, in the northwestern part of the state. It lies on Rock Creek, a tributary of Rock River, 120 miles west of Chicago, and is reached by the Chicago and Northwestern railroad. Its population in 1900 was 2,308. W.F.J.

MORRISON, William Ralls, an American statesman; born in Monroe County, Ill., Sept. 14, 1824. He graduated at McKendree College, became a lawyer, and served as a private in the Mexican war. He was clerk of the circuit court of Monroe County, 1852–54; member (Speaker, 1859) of the Illinois legislature, 1855–59; colonel of the 49th Illinois Volunteers, 1861–63; Representative in Congress from Illinois, 1863–65 and 1873–85. He introduced the tariff act known as the "horizontal" or Morrison bill. In 1887 he was appointed a member of the Interstate Commerce Commission, and was reappointed in 1892; was chairman of the Commission from September, 1891, to December 31, 1897, in which year he resumed the practice of law. E.E.T.



WM. R. MORRISON.

MORRISTOWN, a town and the county seat of Morris County, New Jersey, in the northern part of the state. It occupies a superb site among the hills, between the headwaters of the Passaic and Rockaway rivers, and is famous for its salubrity and for the beauty of the scenery by which it is surrounded. It is a place of much historic interest, having been the headquarters of the American army for a considerable time during the Revolutionary War, and containing, still in fine condition, the house which Washington occupied as his headquarters during the winter after his brilliant Trenton and Princeton campaign. In the Civil War it contributed a large contingent of troops to the National army, and an imposing monument in the town park commemorates those who fell in the struggle. The town has few industries, but has long been an important financial and commercial center for the mining and manufacturing region which lies at the north and west, and for the agricultural and fruit-growing country south of it. It contains a number of high schools and seminaries, including a large convent and convent school of the Roman Catholic Church, and has the newspaper, banking, church and other equipments of a considerable city, and is a favorite place of residence. It is reached by the Delaware, Lackawanna and Western and the Rockaway Valley railroads, and had in 1900 a population of 11,267. W.F.J.

MORRISTOWN, a post village, a railroad junction and the capital of Hamblen County, Tennessee.

in the northeastern portion of the state, 42 miles N.E. of Knoxville, on the Morristown and Cumberland Gap and the Southern railroads; has a stove factory, machine-works, carriage and tobacco factories, steam-mills, medicine-works and extensive marble-yards. The town contains two colleges. Population 1890, 1,990; 1900, 2,973.

MORSE, Edward Sylvester, an American scientist; born in Portland, Me., June 18, 1838. He was educated at Bethel (Me.) Academy, and studied for three years with Louis Agassiz at the Lawrence Scientific School, Harvard. He was professor of comparative anatomy and zoology at Bowdoin College from 1870 to 1873, and professor of zoology in the Imperial University, Tokio, Japan, from 1877 to 1880. He was vice-president in 1876, and president in 1885, of the American Association for the Advancement of Science, and is a member of numerous learned societies in the United States and abroad. In 1898 he received the Japanese decoration of the Order of the Rising Sun. He is the director of the Peabody Academy of Science, Salem, Mass., and the keeper of the Japanese pottery in the Museum of Fine Arts, Boston. He is the author of *Japanese Homes and Their Surroundings* (1886); *Catalogue of the Morse Collection of Japanese Pottery* (Museum of Fine Arts, Boston) (1901); and of many papers on zoology, ethnology, and archæology. E.E.T.

MORSE, John Torrey, Jr., an American author; born in Boston, Mass., Jan. 9, 1840. He graduated at Harvard in 1860, later practised law in Boston, and was lecturer on history at Harvard from 1876 to 1879. He is the author of *Treatise on Banks and Banking; Law of Arbitration and Award; Famous Trials;* and *Lives of Alexander Hamilton; O. W. Holmes;* also (in "American Statesmen" series) *A. Lincoln; J. Q. Adams; T. Jefferson; John Adams;* and *B. Franklin.* E.E.T.

MORSE, Sidney Edwards, an American journalist and inventor; born in Charlestown, Mass., Feb. 7, 1794. He graduated at Yale in 1811 and studied law in Litchfield, Conn. In 1815 he founded and for 15 months edited the *Boston Recorder*. In 1817, in connection with his elder brother, S. F. B. Morse, he invented and patented the flexible piston pump. He published two school geographies, and in 1823, with his younger brother, Richard C. Morse, established the *New York Observer*. In 1834 he invented a process of producing maps, which he called cerography, by which the plates could be used in connection with common printing-types on an ordinary printing-press. He died in New York, Dec. 23, 1871. E.E.T.

MORTIFICATION or GANGRENE. See Surgery, Vol. XXII, p. 718.

MORTISING-MACHINE. The mortising of woodwork, as in framing timbers, making doors, sashes, etc., is accomplished almost wholly by power-machines, the prevailing type having an upright metal framework, and bearing at the top a wheel-crank that reciprocates the chisel. The work is mounted on an adjustable table two or three feet from the floor, and a treadle serves to bring it within reach of the reciprocating chisel. Boring-attachments often are added; also, compound tables, with rack and pinion feed. Reversible chisels are used, and frictional belts, that slip in case any unusual strain is encountered. The chain-mortiser, introduced about 1891, makes use of an endless chain, formed of small cutters. This will cut closer to the edge of wood without splitting than any other mortiser. Its operation is also very much faster for many classes of work. The cutters follow each other with such rapidity, each taking away a very small portion of wood, that the action is more like that of a file or milling-cutter than of a chisel. This machine is coming rapidly into increased use.

MORTON, Henry, educator; born in New York city, Dec. 11, 1836; was graduated at the University of Pennsylvania in 1857. Three years later he became a teacher of physics and chemistry in the Episcopal Academy of Philadelphia, and in 1867 accepted the chair of physics and chemistry at the University of Pennsylvania. He retained this chair till 1870, when he was chosen president of the newly-founded Stevens Institute of Technology at Hoboken, N. J., to which he made many liberal gifts of money. He published *The Fluorescent Relations of a New Hydro-carbon Found in Petroleum Distillates; Engineering Fallacies*, etc. He died in New York city, May 9, 1902. G.J.H.

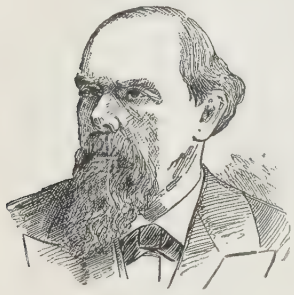
MORTON, J. Sterling, an American statesman; born in New York, April 22, 1832, of Scottish ancestry; graduated at Ann Arbor, and later at the Union College of Law, New York City; did newspaper-work in Detroit, Michigan, Chicago, and finally in Bellevue, Nebraska. In 1855 he was elected to the Nebraska territorial legislature. In 1858 he was secretary of the territory, and became acting governor on the resignation of Governor Richardson. He was appointed Secretary of Agriculture by President Cleveland in March, 1893. He wrote the article on Agriculture in these Supplements. Died at Chicago, Ill., April 27, 1902.

MORTON, Levi Parsons, an American statesman and financier; born in Shoreham, Vt., May 16, 1824; a son of the Rev. Daniel Morton. At the age of 16 he became a clerk in a country store; started in business in Hanover, N. H., and in 1849 went to Boston, where he was admitted as a partner in a prominent mercantile firm. In 1854 he removed to New York, and in 1863 established the banking house of Morton, Bliss & Co. In 1878 he was elected to Congress, and was re-elected in 1880. Under President Garfield's administration he was appointed minister to France, where he served till after the election of President Cleveland. In 1888

LEVI P. MORTON.

he was elected Vice-President on the Republican ticket, headed by Benjamin Harrison, and was governor of New York from 1894 to 1896. W.M.C.

MORTON, OLIVER PERRY, an American public man; born in Wayne County, Ind., Aug. 4, 1823. At the age of 15 he was apprenticed to a hatter, at which trade he worked for four years. He then entered the Miami University, and graduated therefrom in 1843, after which he studied law, and was admitted to the bar in 1847. He entered on the practice of his profession at Centerville, Ind., and was elected circuit judge in 1852. In 1856 he received the Republican nomination for the governorship of Indiana, but was defeated. In 1860 he was nominated for the lieutenant-governorship of the State (with the understanding that Gen. Henry S. Lane, whose name was placed at the head of the Republican ticket, was to be elected to the United States Senate in the event of Republican success), and was elected. The condition being fulfilled, Gov. Lane held office but two days, when he resigned, and was elected senator, Lieut.-Gov. Morton then assuming the gubernatorial chair. During the period of the Civil war he was indefatigable in upholding the Federal cause, and his exertions in this regard give his name one of the foremost places among those of the "war governors." In 1864 he was elected to the same position; but in the fall of 1865 he was stricken with partial paralysis, an attack from which he never recovered. He was elected United States senator in 1866, as a Union Republican, to succeed Henry S. Lane, and was re-elected in 1872, serving from March 4, 1867, until his death. In consequence of the affliction mentioned above he was compelled to accomplish his work through the medium of secretaries, to be carried in and out of the Senate Chamber, and to address the Senate from his seat. He died in Indianapolis, Nov. 1, 1877. E.E.T.



OLIVER P. MORTON.

MORTON, PAUL, an American executive officer; born in Detroit, Mich., May 22, 1857; son of J. Sterling Morton, Secretary of Agriculture under President Cleveland; engaged in railroad business with the Burlington system in 1872, and became third vice-president of the Atchison, Topeka and Santa Fé Railroad Company in 1896. He was a Democrat till 1896, when he became a Gold Democrat, and early in 1904 he affiliated with the Republican party. In June, 1904, he was appointed Secretary of the Navy. G.J.H.

MORULA. See ANIMAL KINGDOM, Vol. II, 46–47.

MOSASAURIA. See REPTILES, XX, 457, 479.

MOSBY, JOHN SINGLETON, an American soldier; born in Edgemont, Powhatan County, Va., Dec. 6, 1833. He was graduated from the University of Virginia in 1852 and was admitted to the bar in 1855. In the Civil War he became scout to Gen. James E. B. Stuart, and guided Stuart's cavalry in a desperate raid on McClellan's army on the Chickahominy in June, 1862. In 1863 he recruited an independent troop of cavalry which became famous under the name of Mosby's Rangers. This command became a terror to the Union troops. Later his force was pressed into the regular Confederate army as the 43rd Virginia cavalry and served until the close of the war. At Chantilly, March 16, 1863, he defeated a much larger force than his own. His most brilliant exploit was the capture of Brig.-Gen. Stoughton, U. S. A., at Fairfax Courthouse. He harassed the rear of Grant's army, in its advance on Fredericksburg and one of his most important raids was the capture of Sheridan's supply train which he surprised near Berryville. He was commissioned captain in March, major in April, and colonel in July, 1863. His regiment was disbanded in April, 1865, when he took up the practice of law at Warrenton, Va. In 1866, he became a Republican and from 1878 to 1885 was United States Consul to Hong Kong. He has written: *War Reminiscences* (1887); *The Dawn of the Real South* (1901). W.M.C.

MOSCOW, a town of Latah County, Idaho, in the northern part of the western border of the state. It is reached by the Union Pacific and Northern Pacific railroads. It is a center of mining and agricultural interests, and is the seat of the University of Idaho, a state institution founded in 1899. The population of Moscow in 1900 was 2,484. W.F.J.

MOSELEY, HENRY, an English clergyman, educator and author; born in London, in 1801. He was educated at Cambridge and received orders in the Church of England in 1828. From 1831 to 1845 he was professor of natural philosophy and astronomy in King's College, London. In 1853 he was made canon of Bristol Cathedral and in 1855 was appointed chaplain to the Queen. He wrote numerous technical works and college text-books and in 1847 published his most important work, *Lectures on Astronomy*. He died in Olveston, England, January 20, 1872. W.M.C.

MOSELEY, HENRY NOTTIDGE, English naturalist, son of the preceding; born at Wandsworth, Nov. 14, 1844; graduated at Exeter College, Oxford, 1868; studied medicine in London, Vienna, and Leipsic; took part in the Ceylon and southern India expedition to observe the solar eclipse of 1871; member of the *Challenger* scientific expedition in 1872, he brought back fine botanical collections. On his return he was elected fellow of Exeter College, and wrote *Notes of a Naturalist on the Challenger* (1879), a book of intense interest and graphic descriptions; appointed Linacre professor of human and comparative anatomy in Oxford University in 1889. Wrote, besides many scientific monographs and articles, *Oregon: Its Resources, Climate, People, and Productions* (1878). Died in Clevedon, Somersetshire, Nov. 10, 1891.

MOSELLE, a river. See FRANCE, Vol. IX, p. 447.

MOSENTHAL, JOSEPH, an American musician; born in Cassel, Germany, Nov. 30, 1834.

In 1853 he settled in New York City, became choir director of Calvary Church in 1860 but resigned in 1887. In 1867 he became conductor of the Mendelssohn Glee Club and in 1870 of the Teutonia Vocal Society. He has composed numerous musical works for the Episcopal Church service. W.M.C.

MOSER, JUSTUS. See GERMANY, Vol. X, p. 478.

MOSKVA, a river of Russia. See MOSCOW, Vol. XVI, p. 883.

MOSS HAGS, an old time term that has come into currency with the popularity achieved by Crockett's Scotch novel, *The Men of the Moss Hags*. The term is of Border origin, and refers to the natural pits or quagmires in mossy ground, or any broken ground in a bog capable of offering concealment, and in which the Covenanters frequently took refuge when pursued by the Royalists.

MOSSY CREEK, a village of Jefferson County, Tenn., on the Southern Ry., 29 miles E.N.E. of Knoxville. The Carson and Newman College, a co-educational Baptist institution, in 1902 had 14 instructors, 331 students, and a library of 4,000 volumes. Pop. 1900, 750.

MOSQUERA, THOMAS CIPRIANO. See COLOMBIA, Vol. VI, p. 141.

MOSQUITO COAST AND MOSQUITO RESERVATION. See NICARAGUA, Vol. XVII, 491–493.

MOSS–AGATE. See AGATE, Vol. I, p. 248.

MOSSBUNKER. See MENHADEN, XVI, p. 14.

MOSTAGANEM, a town of Algeria, on the coast, 45 miles N.E. of Oran. It manufactures pottery, and has corn-mills and tanneries. Population 1886, 13,900, more than one-third being Europeans. It was a place of 40,000 in the 16th century, and has again grown up since the French took possession in 1833.

MOTASALIS OR MOTAZALITES. See AL-MAMUN, Vol. I, p. 519.

MOTHER CAREY'S CHICKENS. See PETREL, Vol. XVIII, p. 725.

MOTHS. See BUTTERFLIES AND MOTHS, Vol. IV, pp. 527–532.

MOTION. See MECHANICS, Vol. XV, pp. 760–774. Of fluids, see *Hydro-dynamics*, under HYDRO-MECHANICS, Vol. XII, pp. 477, 481, 548.

MOTION, in plants. See PHYSIOLOGY, Vol. XIX, pp. 69–71.

MOTOORI, MORINAGA. See JAPAN, Vol. XIII, pp. 591, 597.

MOTORS FOR LOCOMOTION. With changes in methods of cheap local transportation, numerous competitors have appeared in the field formerly monopolized by the steam-locomotive. New motors have been devised and used to propel every sort of vehicle from heavy railway cars to bicycles. The motive powers employed are electricity, compressed air, coal-gas, gasoline, etc. Some hydraulic systems of propulsion have also been devised.

Perhaps the most conspicuous example of a successful electric locomotive is the one placed in the Belt Line tunnel of the Baltimore and Ohio railroad in 1895. In this, the electric motors, which are of the six-pole gearless type, are set direct upon the axles, so that the armatures surround them. The trucks have flexible supports for the motors, and specially designed flexible couplings are used to transmit the motion from the armatures to the wheels. The armatures are of the ironclad type, having hollow shafts for the wheel-axles. Power is conveyed to the motors from an overhead conductor, much too large to be termed a wire, through a slider which serves the same purpose as the trolley-wheel of a trolley-car.

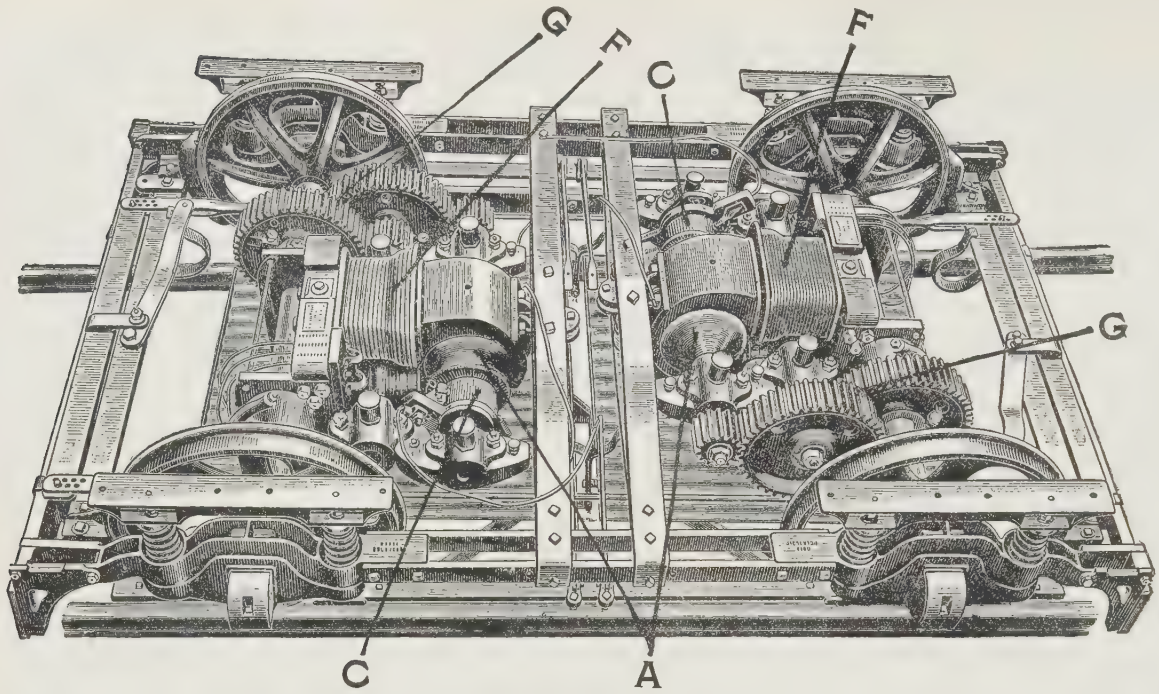
The Sprague electric locomotive is very similar to the above. Its motors have the armatures about the axles, the field-magnets consisting each of two castings having two field-coils placed at the ends of the motors, forming two consequent and two salient poles. The magnets are compound-wound, and the armatures of the slotted Westinghouse type.

For underground-work in mines, various kinds of electric locomotives have been built, ordinarily making use of some familiar form of street-railway motor. The Baldwin and Westinghouse concerns have built one which is driven by two Westinghouse motors, receiving the power through two trolley-arms. These motors are connected with the axles by double reduction-gears, being designed for heavy loads on steep grades at slow speed.

In the Brott system of electric locomotion, the motors are mounted on the car-axles, so that locomotives, commonly so-called, are dispensed with. The power is taken from a conductor below the cars, and any form of gearless motor may be used.

The common type of street-railway motor is shown in the accompanying illustration. As electric motors are not readily operated except at high speeds, sets of gear-wheels are introduced to reduce the speed so that it may be suitable for street-travel. These gears produce the familiar grinding noise heard below the cars, and the noise would be very much greater but for ingenious construction of the gears with alternate plates of metal and rawhide or some similar device.

Compressed-air motors, driven from storage-tanks, are used on several European street-railways, and are being introduced into the United States. A motor for using compressed air consists primarily of a cylinder and piston, the air being admitted through ports, so as to drive the piston, after which the air is freed. This is the principle of the steam-engine cylinder, but in practice there are wide differences in the minor arrangements of the two mechanisms. Compressed air, when expanded, tends to withdraw the heat from everything in its vicinity, so that freezing may easily result unless provided against. It is also desirable to use the air heated, in order to secure as great expansive power as possible. These conditions have involved much experimentation in the production of economical motors. To partially avoid the loss of heat (which means, also, the loss of power) in compressing the air, the usual method is to compress air in three stages, recovering the heat of compression by passing the air through tubes around which cold water is circulating. The cooling water when heated is fed to the boilers, so that a large portion of the heat is thus saved. The cold air being stored in stout steel reservoirs at a pressure of say 2,000 pounds, the reservoirs are loaded on to the car that is to be driven. This pressure is far too



ELECTRIC MOTORS ON A STREET-RAILWAY TRUCK.

The current being supplied from the trolley wire to the brushes on the commutators, C C. The armatures, A, rotate within the poles of the field-magnets, F F, and motion is communicated to the axles of the truck through the reduction-gears, G.

great for use in a cylinder, hence the air is first let out into a receiving-cylinder, where a pressure of 50 to 150 pounds is obtained. It is next admitted to a heater for expansion, and as it carries from the heater a certain amount of steam, its expansive qualities are increased at the same time that the difficulties connected with freezing are avoided.

Gas-motors have been used for street-cars, ordinary coal-gas being employed, compressed simply to save space, and stored in tanks under the cars. The Luhrig gas-motor has four cylinders, all connected with one driving-shaft, so that the power may be always available, since gas-engines, as a rule, give out power only at every fourth stroke. The gas is admitted to the cylinders, mixed with a proper proportion of atmospheric air, and ignited, causing a miniature explosion which gives a thrust to the piston.

The MacMahon ammonia-motor was exhibited at the Chicago Exposition in 1892. It makes use of anhydrous ammonia, instead of water, in the boiler, the advantage being that the ammonia vaporizes or turns into steam at a very low temperature. As ammonia is expensive, a condensing-apparatus is provided for using it over and over again. Thus the cost of running is confined principally to the expense of the fuel, as is the case with the steam-engine.

For operating autocars, bicycles, railroad velocipedes, and other vehicles requiring small power, the gasoline-motor is generally preferred, because of the light weight of the fuel carried. The common principle of all these motors consists in allowing the gasoline to escape from a small tank, drop by drop, each drop being vaporized and mixed with air in a cylinder, in such proportion that when a flame or electric spark is applied the mixture explodes and gives an impulse to the piston.

The hydraulic system of car-propulsion has not emerged from the experimental stage, though it possesses some peculiar advantages. The form that has attracted the most attention makes use of water-jets between the rails to drive the cars by impinging on pallets or buckets on the lower surface of the vehicles. The sliding hydraulic railway substitutes runners in place of wheels, a slippery surface being maintained on the rails by forcing water through minute holes in the surface of the runners, so that they actually slide on a very thin stratum of water.

While all these systems and forms of motors have their advocates and advantages, it is to the electric motor that the general public looks for improved means of locomotion. This motor has no power except that which is put into it from an outside source, yet it affords such conveniences in the way of transmission of power, that the minds of many thousands of inventors and engineers are turned toward its development. It should be remembered that a dynamo or generator and an electric motor are practically the same thing, only reversed in action. If you drive one by belt, or by direct connection with a steam-engine, you generate a current which may be conducted out on a wire to do useful work, as in lighting or in running motors. If you would use the same machine as a motor, you simply connect the wires with a source of electricity, and run it the other way, when power is developed, and you may use it to drive machinery.

The annexed diagrams show a very simple form of electric motor, which may assist in a correct un-

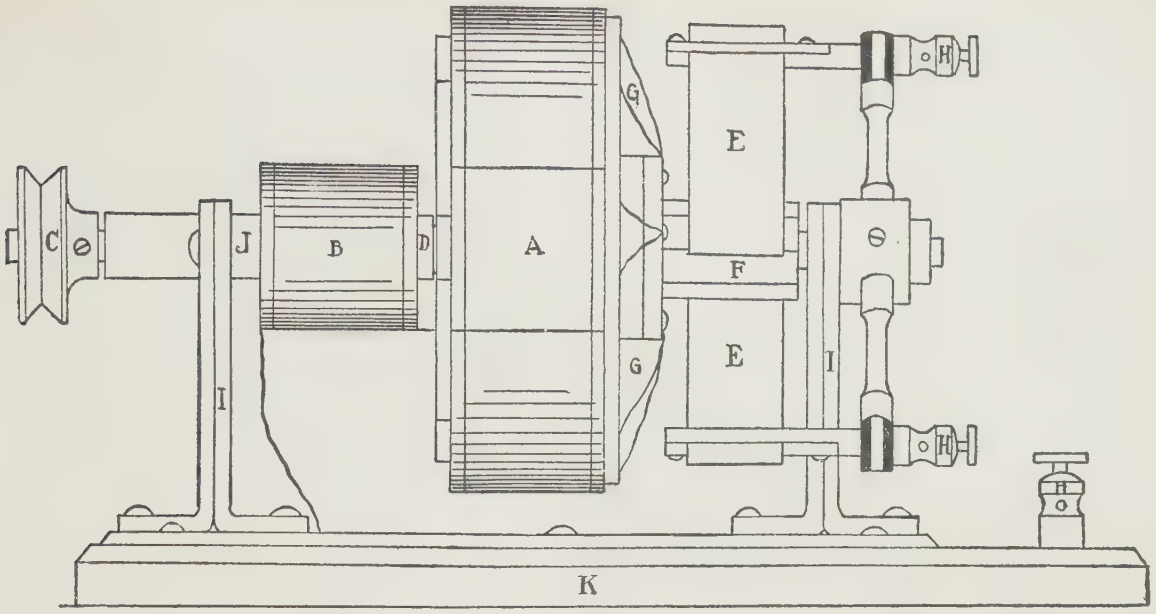


Fig. XI.

A—Armature. B—Field-magnet. C—Pulley. D—Pole-piece. E—Brush. F—Commutator. G—Wires connecting armature-coils with commutator-bars. H—Binding-posts. I—Standard. J—Yoke. K—Base-plate.

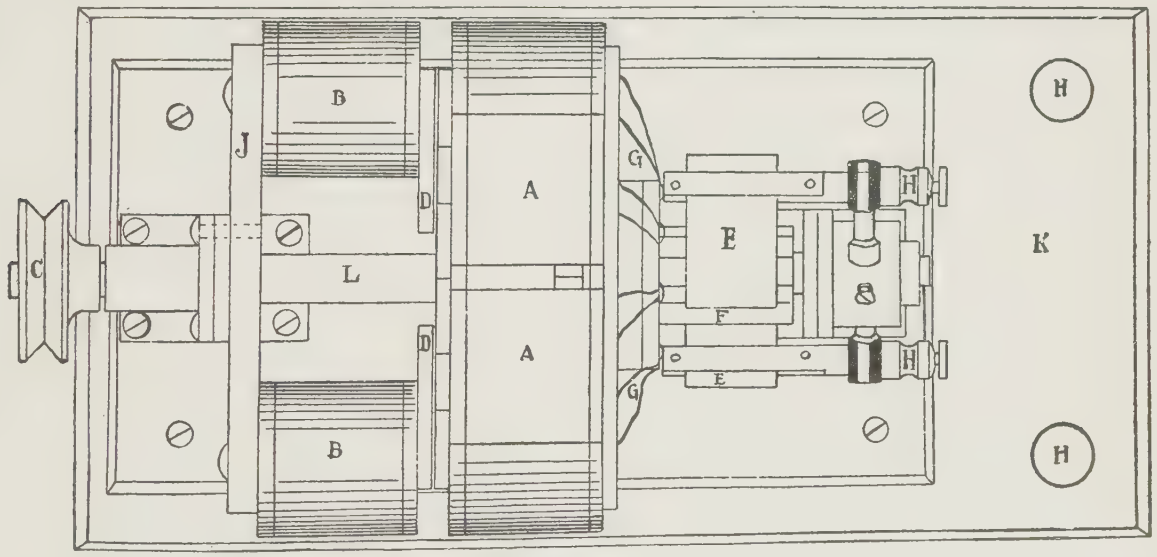


Fig. XII.

A—Armature. B—Field.magnet. C—Pulley. D—Pole-piece. E—Brush. F—Commutator. G—Wires connecting armature-coils with commutator-bars. H—Binding-posts. I—Standard. J—Yoke. K—Base-plate. L—Main staff.

derstanding of its principles. One is a side view, the other a top view of the same machine. The field-magnet here consists of two coils of insulated wire on soft iron cores. They are connected by a yoke, and the pole-pieces are magnetic when a current of electricity is run through the coils. Around the pole-pieces of this magnet are lines of force, such as may be observed with a toy horseshoe-magnet in playing with small tacks, steel fillings, etc. Within these lines of force the armature is rotated. In this case the armature is wheel-shaped, and has six inner coils of wire, connected by wires to the six bars of the commutator. The commutator-bars are insulated from each other, and the inside end of one coil in the armature and the outside end of the next coil are fastened to one commutator-bar. The next coil in the armature is connected reversely to the next bar, and so on. The brushes are arranged to bear lightly against the surface of the commutator-bars, and are connected with wires leading from the binding-posts. To use the machine as a dynamo or generator of electricity, it is necessary to apply power to the pulley. This rotates the armature within the lines of force of the field-magnet, setting up an induced current of electricity, which is carried off through the brushes to the wires. To

use the machine as a motor, a current is led to the brushes, and the lines of force set up tend to rotate the commutator and armature, hence the pulley on the other end of the shaft, from which machinery may be driven. See also AUTOMOBILES in these supplements. C. H. COCHRANE.

MOTT, LUCRETIA, an American philanthropist; born in Nantucket, Mass., Jan. 3, 1793. She married James Mott, a well-known abolitionist, and at 25 entered the ministry of the Society of Friends. Her sympathies were with the downtrodden of all classes, especially with the slaves of the South, and she was deeply impressed with the unequal condition of women. She boldly defended the right of women to speak in public, and shared the perils which the abolitionists braved in their fight against slavery. In 1833 she was instrumental in founding the Philadelphia Female Anti-Slavery Society, and in 1848 took part in the first Woman's Rights Convention at Seneca Falls, N.Y. She died in Philadelphia, Nov. 11, 1880. E.E.T.

MOUFFLON. See SHEEP, Vol. XXI, pp. 820, 821.

MOUKDEN, CITY OF. See MANCHURIA, Vol. XV, p. 473.

MOUKHTAR-PACHA-GHAZI, AHMED, an Ottoman general; born Oct. 31, 1839, at Broussa, Anatolia; graduated with honors at the Constantinople Military Academy; entering the staff corps as a captain, he distinguished himself against the Montenegrin insurgents in 1860; professor of astronomy, tactics and fortifications at the military academy in 1861–63; as lieutenant-colonel he was appointed tutor to the eldest son of Sultan Abdul-Aziz in 1865; made a member of the Imperial Council of War in 1869; the same year he subdued the rebellion of twenty thousand Arabs in Yemen, and placed in command of the Turkish troops in the region with the rank of ferik (general of division). In 1871, aged 33, he was made mushir (full general) and governor of Yemen; transferred to Crete in 1873; commander of the Shumla Army Corps; a year later he was made governor of Armenia. In 1876 he commanded in Bosnia, Herzegovina and Montenegro, gaining twenty battles and losing one. Appointed governor of Armenia when the Russo-Turkish war began in March, 1877, he organized and sustained the defense of his province against enormous odds. Was made a Ghazi (or conqueror), the highest title in the gift of the Sultan, in October, 1877; grand master of artillery in 1878; since 1885 represented the Sultan at the Egyptian court.

MOULD OR MOLD. See FUNGUS, Vol. IX, pp. 729–730; and BOTANY, Vol. IV, pp. 84, 96.

MOULDING OR MOLDING. See ARCHITECTURE, Vol. II, p. 411; and BUILDING, Vol. IV, pp. 423, 435, 436, 453. A process, see FOUNDRY, Vol. IX, pp. 423–425; and POTTERY and PORCELAIN, Vol. XIX, pp. 658, 663.

MOULINS. See GLACIER, Vol. X, p. 559.

MOULTING OR EXUVIATION. See BIRDS, Vol. III, pp. 672, 673.

MOULTON, LOUISE CHANDLER, an American author; born in Pomfret, Conn., April 10, 1835. In 1855 she married William U. Moulton, who died in 1898. She is the author of many children's books, among which a series of *Bedtime Stories* is prominent. Her first book, *This, That, and the Other*, was published when she was only 18 years of age. Other books are: *Some Women's Hearts* (1874); *Ourselves and Our Neighbors* (1887); *In the Garden of Dreams* (1889); and *At the Wind's Will* (1899). She has also written some excellent poetry, has edited several collections of poems, and has been a frequent contributor to magazines, reviews, and newspapers. E.E.T.

MOULTON, RICHARD GREEN, Professor of English Literature, University of Chicago; was born in England in 1849, and educated at Bath, and at Christ's Coll., Cambridge. In 1891 he obtained the Ph. D. degree at the Univ. of Penn., and in the following year was appointed to a chair at the Univ. of Chicago. Has lectured extensively, before English and American colleges, on the University Extension teaching. His publications embrace *Shakespeare as a Dramatic Artist; The Ancient Classical Drama, a Study of Literary Evolution; The Literary Study of the Bible;* and *The Modern Reader's Bible* (23 volumes).

MOULTRIE, FORT, an historic fortification on Sullivan's Island, at the northeast side of the entrance to Charleston harbor, South Carolina, and opposite Morris Island, which see in this volume, p. 146. The original fort was hastily built of palmetto logs at the beginning of the Revolutionary War, under the direction of William Moultrie (q.v., infra). An attack was made upon it by a British squadron commanded by Sir Peter Parker, in June, 1776, and the fort, mounting 26 small guns and manned by 435 men, proved impregnable. The palmetto logs were green and would not burn, and were spongy and would not splinter, and thus successfully resisted the British fire. In later years the fort was rebuilt in modern fashion, and formed one of the defences of Charleston in the Civil War. W.F.J.

MOULTRIE, WILLIAM, soldier; was born in England in 1731, settled in South Carolina, and identified himself with the Revolution. In 1775 he was appointed a colonel of South Carolina troops, and built Fort Moultrie (q.v.) at the entrance to Charleston Harbor. He rose to be a brigadier-general, won a victory near Beaufort, but was captured at the fall of Charleston in 1780. He declined an offer of a commission in the British army and instead remained a prisoner until the end of the war. In 1785 and again in 1794 he was governor of South Carolina, and he wrote a history of the Revolutionary War in the Carolinas and Georgia. He died in 1805. W.F.J.

MOUND-BUILDERS. See AMERICA, Vol. I, pp. 606, 608.

MOUND CITY, a post village and the capital of Pulaski County, Illinois, seven miles N. of the mouth of the Ohio River, on the Cleveland, Cincinnati, Chicago and St. Louis railroad. It contains a national cemetery, and had formerly the United States navy-yard. It has two barrel facto-

dries and a boat-building yard. Population, 1890, 1,965; 1900, 2,705.

MOUND CITY, a city of Holt County, Missouri, in the northwestern part of the state, twelve miles from the Missouri River, and thirty-two miles northwest of St. Joseph. It is the center of a farming, fruit and stock country, is reached by the Kansas City, St. Joseph and Council Bluffs railroad, and had in 1900 a population of 1,681. W.F.J.

MOUNDSVILLE, a city and the county seat of Marshall County, West Virginia, at the foot of the northern "pan-handle" of that state. It lies on the Ohio River, eleven miles below and south of Wheeling, and is reached by the Baltimore and Ohio and the Ohio River railroads. It lies in a rich mineral region, with coal and asbestos mines and deposits of fine brick clay, and is also a center of the lumber trade, of glass manufacture, and of agriculture. It gets its name from an ancient mound, of unknown origin, in which human remains were found, the mound apparently being a rude pyramid of aboriginal construction. The place had in 1900 a population of 5,362. W.F.J.

MOUNET, JEAN SULLY (stage-name "Mounet-Sully"), a French actor; born at Bergerac, France, Feb. 27, 1841; graduated from the National Conservatory of Music and Declamation, Paris, in 1868, with a first tragedy prize; served in the army during the Franco-Prussian war of 1870–71; was about giving up the stage when he was allowed to play the part of *Orestes*, at the Comédie Française, in 1872, and was so successful that on Jan. 1, 1874, he was elected a member of this famous company. When his talent had matured and widened, he was recognized as the leading living French tragedian. He possessed a fine, powerful physique, eyes full of southern fire, and a wealth of stately gestures. He obtained his greatest successes in the plays of Racine, Corneille, Voltaire, and Victor Hugo, and in adaptations from Shakespeare and Sophocles. He also succeeded brilliantly in more modern dramas by Augier, Dumas *père* and Dumas *fils*, etc.

MOUNTAIN-ASH, a name given to certain species of the genus *Pirus*, with pinnate leaves, large clusters of white flowers and scarlet berry-like fruit. The genus belongs to the family *Rosaceæ*, and the species with simple leaves are the well-known apples and pears. The two American mountain-ashes are *P. Americana* and *P. sambucifolia*, both indigenous toward the north, and often planted for ornament. *P. aucuparia*, a European species, also is cultivated often.

MOUNTAIN-LION. See PUMA, Vol. XX, p. 110.

MOUNTAIN RAILWAYS are lines of railway having gradients too steep to be overcome by the ordinary type of locomotive. Among the first devices used to haul cars up an incline, to the track of which the wheels of a locomotive would not adhere by reason of the grade, was that of attaching a cable to the car, and pulling it to the top of the grade by power derived from an engine there located. Another method long in use was that of laying toothed or rack rails on the line of track to engage cogs either in the circumference or on the axle of the drive-wheel of the locomotive. Still another method consisted of attaching the car by clamp-wheels to an endless, moving cable passing over grooved wheels at either end of the route and supported by sheaves at regular distances in the middle of the track, the cable being propelled by passing over a large drum, to which motion was given by a stationary engine located at the top of the incline. Of recent years the electric trolley system has been successfully used on mountain railways of moderate grades.

One of the earliest mountain roads constructed in the United States was the line running from the mines at Summit Hill to Mauch Chunk, Pennsylvania, a distance of nine miles, which was completed May, 1827. It was used to carry coal, the gradient was 95 feet per mile, and up to 1844 the road was operated entirely by gravity, the cars being drawn back to the mines, over a circuitous route, by mules. At the latter date the empty cars were drawn up an inclined plane by cables operated by an engine located at the top of the inclines, of which there were two, the first with a length of 2,070 feet and a grade of 23 per cent, and the second with a length of 2,322 feet and a grade of 29.8 per cent.

In 1833 a road 36 miles in length, extending from Hollidaysburg to Johnstown, Pennsylvania, and called the Allegheny Portage road, was built in ten planes, varying from 7 to 10 per cent gradient. The longest plane was 3,116 feet in length, and all were provided with stationary steam-engines at the summits, propelling endless cables. This road was abandoned about 1853. Throughout the mining districts of Pennsylvania, mountain roads operated entirely by gravity have been in operation for many years. The weight of the loaded cars going down the grade brought back the empty cars, and by a system of different planes long distances were often traversed. In 1887 a road was completed up Lookout Mountain, Tennessee. The length, measuring up the slope, was 4,360 feet, and the grade 26 per cent, on the average. The Catskill railway, completed in 1892, was 7,000 feet in length, the average grade about 12 per cent, the maximum being 43 per cent. It was, up to 1896, the longest mountain road operated by cable in the United States.

The first application of the rack-rail system in this country was at Madison, Indiana, in 1847. The locomotives were equipped with toothed wheels on the driving-axles, which engaged with the teeth of rack-rails laid on the track. The length of the plane was 7,040 feet, and the gradient 5.8 per cent, on the average. The Mount Washington railway, completed in 1869, is 3.33 miles in length, the maximum grade 40 per cent, the minimum 13 per cent. The locomotives were so constructed as to have the boilers nearly horizontal when on the average grade. In 1882 a road was built at Mount Desert, Maine, the total length of which was 6,300 feet. The grades were alternately steep and light, the maximum being 33 per cent. The locomotive drew one car at a time, at an average speed of from three to four miles per hour.

In 1890 a road ascending Pike's Peak, in Colorado, was constructed for a distance of almost nine

miles, reaching an altitude of 14,134 feet. For about two miles the maximum grade is about 25 per cent, the remainder of the distance varying from 12 to 22 per cent. The system used to make the ascent is that of having the locomotive equipped with four cylinders. The outer two operate the drive-wheels running on ordinary rails. The inner pair of cylinders operate a central toothed wheel, which runs on a single racked rail, laid on such portions of the line as are of steep gradient. The Mont Cenis railway, completed in 1865, and the Rigi railway, completed in 1871, both in Switzerland, are operated by the rack-wheel system, and the Zermatt railway, 22 miles in length and opened in 1891, is operated by the combined system, as above described.

The Mount Lowe railway, in southern California, is an example of mountain railway-construction almost without a parallel for engineering difficulties. The road runs in two sections, the first starting from a point 2,200 feet above the sea-level, and extending to the summit of Echo Mountain, 3,600 feet in altitude. The incline is about 3,000 feet in length, and makes a direct ascent of 1,400 feet. The grade at the beginning is 60 per cent; after passing the midway point in the incline it is 62 per cent for quite a distance, then it falls off to 58 per cent, and on nearing the summit is 48 per cent. The cars are permanently attached to an endless cable, tested to a strain of 100 tons, while the maximum load never exceeds five tons. The cars are so balanced as to pass each other at an automatic turnout, exactly in the middle of the incline, and are so arranged as to keep the passengers always on the level, regardless of the steep grades of the incline. An electric line extends to the summit of Mt. Lowe, 6,000 feet above the sea-level. The cars are easily propelled, the grades for a distance of four miles scarcely exceeding seven per cent.

Of the mountain railways in Europe, other than those mentioned, Italy has the longest cable inclines in the world. The road ascending Mount Vesuvius is 10,500 feet in length, divided into two planes, one of 6,900 feet, the other 3,600 feet. A road 10,243 feet in length ascends Superga Mountain, but the grade is not in excess of 20 per cent on any portion of the route. That on Mount Pilatus, in Switzerland, is 2.8 miles in length, with maximum grades of 48 per cent. A railway connecting the towns of St. Gallen and Gais, Switzerland, has five planes, with rack-rails, the maximum gradient on one of the planes being 92 per cent.

Mountain railways not using the devices spoken of above rarely have grades exceeding five per cent. To reduce the grades of the lines, recourse is had to spirals, zigzags, switchbacks or "W's". In ascending a considerable elevation, the line is often made to cross itself at different points, by means of bridges or tunnels. The St. Gotthard railway has tunnel-spirals on both the Italian and Swiss sides of the Alps Mountains. A notable case of road-spiral and zigzag combined is that of the Union Pacific, near Georgetown, Colorado. Starting up the mountain, the road climbs a grade of about three per cent, and, forming an ellipse, crosses the starting-point of the figure at an elevation of 75 feet. When the grade again increases, a sharp curve is made, and a zigzag course taken which retains the grade at a point enabling the locomotive to make the ascent. In climbing a mountain by the switchback or "W" method, the train proceeds at as steep a grade as possible, then, instead of making a curve, a switch is thrown, and the train backs up a grade, similar to the first, to another switch, which, being thrown, enables the train to proceed forward again. This operation is continued until the ascent of the elevation is accomplished.

A project for the construction of a line of railway to the summit of Mont Blanc was discussed in 1895 and operations began the following year. The road is to commence at the Miage Ravine, above St. Gervais, immediately passing through a tunnel about 2,400 feet in length. From here a vertical shaft about 9,100 feet in height will carry the passengers to the summit. The estimated cost is $1,800,000, the time of construction ten years. The tunnel is to go in a straight line to the Italian frontier, which would then be skirted for about 4,875 feet. By this means the Mont Blanc Observatory could be reached at all seasons.

MOUNTAINVIEW, a mining town in Washita Co., Okla., on the Washita river, which, founded May 8, 1899, in one day became an organized town of about 800 population.

MOUNT AIRY, a town in Surrey Co., N. C., on the Ararat river, 90 miles N. of Charlotte; has granite-quarries, several mineral springs, an academy, and several mills. Pop. 1900, 2,680.

MOUNT ANGEL COLLEGE, founded in 1887 at Mount Angel, a village in Marion Co., Oregon, 19 miles from Salem, is a Catholic institution conducted by priests. In 1901 it had 24 instructors, 135 students, and a library of 4,000 books.

MOUNT AYR, a town and the county seat of Ringgold County, Iowa, in the "southern tier" of the state. It is in a farming and tobacco-growing country, and is reached by the Chicago, Burlington and Quincy, and the Chicago and Great Western railroads. Its population in 1900 was 1,729. W.F.J.

MOUNT CARMEL, a city and the capital of Wabash County, southeastern Illinois, on the Cleveland, Cincinnati, Chicago and St. Louis railroad, is 132 miles N.E. of Cairo, has abundant water-power and manufactures of wooden dishes, lumber, iron and flour. Railroad-shops are also situated here. Population 1890, 3,376; 1900, 4,311.

MOUNT CARMEL, a post borough and a railroad junction of Northumberland County, Pennsylvania, on the Lehigh Valley and the Philadelphia and Reading railroads, 28 miles E. of Sunbury; has good anthracite coal-mines, which give employment to many men. The town has one daily paper. Population 1890, 8,254; 1900, 13,179.

MOUNT CARROLL, a city and the county seat of Carroll County, Illinois, in the northwestern part of the state. It lies nine miles east of the Mississippi River, on the Chicago, Milwaukee and St. Paul railroad. Its population in 1900 was 1,965. W.F.J.

MOUNT CLEMENS, a city and the capital of Macomb County, Michigan, 20 miles N.E. of Detroit, on the Grand Trunk railroad. It is a much-frequented summer resort, and has gained a great deal of popularity on account of its celebrated mineral springs, which are claimed to be beneficial to those suffering from rheumatism; a regular steamboat line runs daily between Detroit and this place; there are manufactures of cigars, lumber, salt, sash and blinds; also an iron furnace, union school and a public library. Population 1890, 4,748; 1900, 6,576.

MOUNT DESERT ISLAND, a mountainous island, 15 miles long and 12 miles wide, in the Atlantic Ocean, one mile off the coast of Maine, and belonging to Hannock County. Among its villages are Bar Harbor, Northeast and Southwest Harbors, Soamesville, Asticon, Seal Harbor, Seal Cove and East Eden. It is noted for its picturesque scenery, and is a select and fashionable summer resort. Mount Desert Island post-office is at Soamesville. Population of town, 1900, 1,600.

MOUNT FOREST, a village of Wellington County, Ontario, about 100 miles W. of Toronto, on the Canadian Pacific and the Grand Trunk railroads, also on the south branch of the Saugeen River, a tributary of Lake Huron; it has 2 sawmills, 3 flouring and grist mills, 2 woolen-mills, an iron foundry, an agricultural-implement factory, 2 tanneries, 2 brick-fields, and a pottery; it also has good water-power. Population 1901, 2,019.

MOUNT GILEAD, a village and the county seat of Morrow County, Ohio, in the central part of the state, reached by the Ohio Central, and the Cleveland, Cincinnati, Chicago and St. Louis railroads. It is in a farming country, and its manufacturing establishments are chiefly tributary to agriculture. It had in 1900 a population of 1,528.

W.F.J.

MOUNT HOLLY, a post village, railroad junction and the capital of Burlington County, southern central New Jersey, 17 miles S. of Trenton, on the Pennsylvania and the Tuckerton railroads, and on Lancocas Creek. The town is supplied with gas and waterworks, and contains a children's home, iron foundries, thread, saw and planing-mills, machine-shops, turbine-wheel, cotton goods and plow factories. It has a large state fair-grounds and canning factories. Population 1890, 5,500; 1900, estimated at 6,500.

MOUNT HOLYOKE COLLEGE, an institution for the education of young women, located at South Hadley, Massachusetts. It was founded in 1836, by Mary Lyon, as Mount Holyoke Seminary. As such it was maintained until 1888, when it became, under a new charter, Mount Holyoke Seminary and College. Again, in 1893, a change was made; the word *Seminary* was dropped, and the legal title made Mount Holyoke College. There were, in 1902, 46 instructors, 612 students, and 21,000 volumes in the library. The grounds are not far from the Connecticut River, and consist of 70 acres. There were, in 1900, six buildings, including well-equipped scientific laboratories.

MOUNTJOY, a post borough of Lancaster County, southeastern Pennsylvania, 12 miles N.W. of Lancaster, on the Pennsylvania railroad. It is a manufacturing town, producing carriages, agricultural tools, woolen goods, iron castings, flour and furniture; contains seminaries for men and women, and a school for soldiers' orphans. Population 1890, 1,848; 1900, 2,018.

MOUNT MORGAN, a gold-mining township of Raglan County, Queensland, 23 miles S.S.W. of Rockhampton. The gold-mine at the summit of the mount is said to be the richest deposit in Australia, and is very remarkable from a geological point of view. It is found in the crater of an extinct geyser, amidst great blocks of brown hematite, iron ore and siliceous sinter. The gold is of unusual fineness and purity. Population, about 4,000.

MOUNT MORRIS, a post village and railroad center of Livingston County, western New York, 32 miles S. by W. of Rochester, on the Genesee River, and on the Delaware, Lackawanna and Western, the New York, Lake Erie and Western, the Western New York and Pennsylvania and other railroads. It manufactures plaster, lumber, iron, machinery, salt, flour, cigars and brooms, and has an academy and seminary. Population 1900, 2,410.

MOUNT PLEASANT, a city and the capital of Henry County, southeastern Iowa, 36 miles N.W. of Burlington, on the Chicago, Burlington and Quincy and the St. Louis, Keokuk and Western railroads. It manufactures flour, wagons, sashes and blinds, farm tools; contains Iowa Wesleyan University, an academy, and a female seminary. In the vicinity is the State Hospital for the Insane. It has waterworks, gas and electric light plants, banks and papers. Population 1890, 3,997; 1900, 4,109.

MOUNT PLEASANT, a city and the county seat of Isabella County, Michigan, in the central part of the southern peninsula of the state. It is in an agricultural and lumbering region and has extensive trade and industries. It is reached by the Ann Arbor and the Flint and Pere Marquette railroads, and is on the Chippewa River, 45 miles northwest of Saginaw. It is the site of an Indian reservation and school, and also of a state normal school, and is a growing and thriving city. Its population in 1900 was 3,662. W.F.J.

MOUNT PLEASANT, a village of Cabarrus County, western North Carolina, 6 miles E. of Concord, the county seat and nearest railroad station, which is on the Southern railroad. It is notable only as being the seat of North Carolina College, a Lutheran school, founded in 1859, which in 1896 had 5 instructors, 72 students, and a library of 1,500 volumes. Population, 1900, 444.

MOUNT PLEASANT, Pennsylvania, the name of several places in different parts of the state, the chief of them being a borough in a township of the same name in Westmoreland County, in the southwestern corner of the state. It is in the coal and iron country, and also has extensive lime and limestone industries. It is reached by the Baltimore and Ohio railroad, and in 1900 had a population of 4,745. W.F.J.

MOUNT PLEASANT, a town and the capital of Berkeley County, central-southern South Carolina,

on the northern shore of Charleston harbor. It is in an agricultural region, has a saw-mill and a tile factory. It is a summer resort. Population, 1890, 1,138; 1900, 2,252.

MOUNT PULASKI, a city of Logan County, Illinois, in the central part of the state. It lies at the crossing of the Illinois Central and the Peoria, Decatur and Evansville railroads, and had in 1900 a population of 1,643. W.F.J.

MOUNT-STEPHEN, Lord, George Stephen, a Canadian financier; born in Banffshire, Scotland, June 5, 1829. He removed to Canada in 1850, where he engaged in mercantile business and in banking, becoming president of the Bank of Montreal. He was prominent in promoting the completion of the Canadian Pacific railway, for which service he was knighted by the Queen in 1886. He returned in 1880 to England and in 1891 was created Baron Mount-Stephen. He was one of the founders of the Victoria Hospital in Montreal, and has donated large amounts to various Canadian charities. W.M.C.

MOUNT STERLING, a town and the county seat of Brown County, Illinois, in the western part of the state. It lies west of the Illinois River, 60 miles west by north from Springfield, and is reached by the Wabash railroad. It had in 1900 a population of 1,960. W.F.J.

MOUNT STERLING, a city and the capital of Montgomery County, northeastern central Kentucky, 26 miles E. of Lexington, on the Chesapeake and Ohio railroad. It is the distributing-point for a large region; has manufactories of lumber, flour, woolen goods and machinery, and has a military and several public schools and a public library. Population 1890, 3,629; 1900, 3,501.

MOUNT VERNON, a city and the capital of Jefferson County, central southern Illinois, about 76 miles E.S.E. of St. Louis, on the Louisville and Nashville, the Louisville, Evansville and St. Louis, the Chicago, Paducah and Memphis and other railroads. It has large flour and woolen mills, car-shops and saw and planing mills. Population, 1890, 3,233; 1900, 5,216.

MOUNT VERNON, a city and the capital of Posey County, southwestern Indiana, 19 miles W. of Evansville, on the Louisville and Nashville and the Evansville and Terre Haute railroads. It is on the Ohio River, by which it has a large river commerce, and contains flour and lumber mills and is in a fertile farming district. Population 1900, 5,132.

MOUNT VERNON, a town of Linn County, central eastern Iowa, 13 miles E. of Cedar Rapids, on the Chicago and Northwestern railroad. It is in a farming region, and has papers, banks, and two libraries—a public library, containing four thousand volumes, and Cornell College, containing 13,500. Cornell College, founded here in 1857, is a co-educational Methodist-Episcopal institution, which in 1896 had 30 instructors, 562 pupils and an annual income of about $25,000. Population 1890, 1,259; 1900, 1,629.

MOUNT VERNON, a city of Westchester County, southeastern New York, 15 miles N. of New York, on the New York Central and Hudson River and the New York, New Haven and Hartford railroads. It manufactures carriages, glue, horn and rubber jewelry and pens, but it is principally a residence place for business men. Population, 1890, 10,830; 1900, 20,346.

MOUNT VERNON, Ohio, a city and the county seat of Knox County, in the central part of the state. It lies at the intersection of the Akron and Columbus and the Baltimore and Ohio railroads, and has car and engine shops, vehicle and furniture factories, and other industries. It had in 1900 a population of 6,633. See also in Vol. XVII, p. 10. W.F.J.

MOUNT VERNON, Virginia, a township of Fairfax County, in the northeastern part of the state. It lies on the Potomac River, fifteen miles below Washington, D.C., with which it is connected by the Washington, Alexandria and Mount Vernon railroad, and also by steamboats. It is notable as the site of the former home and present tomb of George Washington and is visited yearly by multitudes of tourists. The population of the township in 1900 was 1,033. W.F.J.

MOWAT, Sir Oliver, a Canadian legislator; born in Kingston, Ontario, July 22, 1820. He was called to the bar in 1841 in Upper Canada; began practice in Toronto; was a member of the Canadian assembly (1857–64); provincial secretary in August, 1858; Postmaster-General (1863–64); Vice-Chancellor Upper Canada (1864–72); and Premier of Ontario (1872). He was knighted in 1892. In 1896 he resigned the Ontario Premiership and became Minister of Justice in the Laurier Dominion Cabinet. In Nov. 1897, was appointed Lieut.-Gov. of Ontario.

MOWING-MACHINES. See Harvesting Machinery, in these Supplements.

MOZAMBIQUE CHANNEL, Indian Ocean, a strait separating Madagascar from the mainland of East Africa and extending north to south for about 1,000 miles, with a breadth varying from 250 miles to 600 miles. C.L.S.

MTSKHETHA, probably the most ancient town of the Caucasus, and, down to the fifth century, the capital of the old Georgian kings. It stands on the south side of the Caucasus, 10 miles N.N.W. of Tiflis. It contains a cathedral, already existing in the fourth century, in which the Georgian kings were crowned and buried. When the Poti-Tiflis railway was constructed, an ancient necropolis was laid bare; the graves were those of a cannibal race, and furnished proof that the modern Georgians are the direct descendants of the ancient Iberi.

MUCORACEÆ, suborder of Fungi. See Fungus, Vol. IX, pp. 729, 730.

MUCOUS MEMBRANE. See Anatomy, Vol. I, pp. 743–744; and Digestive Organs, Vol. VII, pp. 192–198.

MUDFISH or BOW-FIN (*Amia Calva*). See Ichthyology, Vol. XII, p. 726.

MUD-HEN, a popular name of several birds of the rail family. The name is usually applied to the marsh, or moor hen (*Gallinula Galeata*) of the Old World and to allied species in all temperate regions. The name is sometimes applied to the

coot (*Fulica America*), which ranges all over North America.

MUDIE, Charles Edward, an English bookseller, founder of the celebrated library which bears his name; born in Chelsea, England, in 1818. Having started as a bookseller, he established his library in 1842, which became a limited company in 1864. In 1890 it had 25,000 members and its annual receipts were $500,000. He published *Stray Leaves* (1872). Died Oct. 28, 1890.

MUD-PUPPY, a popular name generally applied to the salamander *Necturus* or *Menobranchus*. The name is often given to the hell-bender (*Cryptobranchus*) and to related genera.

MUEZZIN, the title of the official of a Mohammedan mosque, whose duty it is to ascend the minaret of the mosque at stated times and call the believers to prayers. His call is in the form of a chant. The words so chanted are: "Allah is most great. I testify there is no God but Allah. I testify that Mohammed is the apostle of Allah. Come to prayer. Come to security." This call is known as the ezann. It is varied by additions at times, and the muezzin gives a special call at midnight for those who desire to perform their devotions at that time.

MUGWUMP. This term is used in modern political parlance for a person who objects to lending his support to the nominees of the national party to which he professes to belong, and with whose general principles he has in the past been in sympathy. The word is said to be a corruption of the *mugquomp* of the Algonquin Indians. This word was employed by John Eliot in the translation of the centurion, duke or leader mentioned in the Bible in Gen. xxxvi: 15. As employed by Eliot, it is a complimentary term, meaning "a man with a following." Tradition ascribes another use of the word, by an Indian who interpreted it to mean "one who thinks more of himself than he really ought." The latter definition was used extensively, modified into "any one who poses as a thinker independent of his political party." The term mugwump was used derisively in 1840, 1865, 1872, and other political years, of men who "bolted" the party ticket. It did not, however, come into general use until 1884, in the Blaine-Cleveland campaign, when those Republicans who refused to support Blaine, and gave their allegiance to Cleveland, were termed mugwumps. The superiority of intellect which these so-called Independent Republicans assumed caused them to be termed "Holier-than-thou men," which is the best definition of the derisive use of mugwump.

MÜHLBACH, Louisa Müller, pseudonym of Mundt, Klara, q.v., in these Supplements.

MÜHLBERG, Germany, a town of Saxony on the west bank of the Elbe, 40 miles north of Dresden. It witnessed the defeat of John Frederick, the Magnanimous, Elector of Saxony, by Charles V, April 24, 1547. Population, 3,500. C.L.S.

MÜHLENBERG, Heinrich Melchior, an American clergyman, founder of the German Lutheran Church in America; born in Eimbeck, Germany, Sept. 6, 1711. He was educated at the University of Göttingen, and at Halle, was ordained in 1739, and from 1739 to 1741 was deacon of the church at Grosshennersdorf. On Sept. 6, 1741 he was called as missionary to the Lutheran congregations of Pennsylvania, located at Philadelphia, New Providence, and New Hanover. The first church edifice at Philadelphia was completed in 1743, and on June 25, 1769, Zion's Church, then considered the largest in the United States, was dedicated there. On Aug. 14, 1748, the first Lutheran Synod in America was organized under the direction of Mühlenberg. His large foreign correspondence was published at Halle in 1787. He died at Trappe, Pa., Oct. 7, 1787. W.M.C.

MÜHLENBERG, John Peter Gabriel, an American clergyman and patriot; born in Trappe, Pa., Oct. 1, 1746; eldest son of Heinrich Melchior Mühlenberg. He was educated for the ministry and was pastor of the German Luthern churches at New Germantown, N. J., and Bedminster, N. J. He was chairman of the Shenandoah County committee of safety, and in 1774 a member of the Virginia House of Burgesses. At Washington's request, he became a colonel in the Continental army. He participated in several battles, was made brigadier-general in 1777, and major-general at the close of the Revolution. After the war he removed to Pennsylvania, served as representative in Congress from 1789 to 1799. In 1801 he was elected United States Senator. He died near Philadelphia, Oct. 1, 1807. W.M.C.

MÜHLENBERG, William Augustus, an American clergyman, great-grandson of Heinrich Melchior Mühlenberg; born in Philadelphia, Sept. 16, 1796. He was graduated from the University of Pennsylvania in 1814 and in 1817 was ordained as a preacher in the Protestant Episcopal Church. From 1846 to 1877 he was rector of the Church of the Holy Communion, New York City. His life was largely given to educational work and the amelioration of the condition of the poor. He organized the first Protestant Episcopal Sisterhood in 1852 and was one of the founders of St. Luke's Hospital, New York City. His published works include *Church Poetry* (1823); *Music of the Church* (1847); *Family Prayer* (1861); *St. Johnland: Ideal and Actual* (1867); *Christ and the Bible* (1869); and *I Would not Live Alway*, *The Story of the Hymn* (1871). He died in New York, April 8, 1877. W.M.C.

MUHLENBERG COLLEGE, an educational institution for men, located at Allentown, Pennsylvania. It is primarily a preparatory college for candidates for the Lutheran ministry, and is under the control of that denomination. It was organized in 1867, and has an endowment of about $161,000. From its organization until 1901, 505 had graduated. In 1901 there were 12 instructors, 151 students, and a library of 10,800 volumes.

MUIR, John, a Scotch-American naturalist and writer; born in Dunbar, Scotland, April 21, 1838. His parents removed to the United States and settled in Wisconsin in 1850. He went to California in 1868, making his headquarters for a number of years in the neighborhood

of the Yosemite Valley. An ardent lover and student of nature, he made a comprehensive study of the glacial formation of the valley as well as of its botanical features. In 1879 he made explorations in Alaska, discovering the glacier which bears his name. In 1881 he accompanied an Arctic expedition in search of the *Jeanette*. He published several works, including *The Mountains of California* (1894); and his articles on *The Water-Ousel; The Shasta Bees; The Douglas Squirrel* and *The Mountain Sheep* are prose poems. Emerson, upon returning from California in 1871, said of Mr. Muir: "He is more wonderful than Thoreau!"

MUIR, Sir William, a British scholar and educator; born in Glasgow, in 1819. He entered the East India civil service in 1837. From 1868 to 1874 he was lieutenant-governor of the Northwest Provinces, and was financial minister to the government of India in 1876. Upon his return to England he sat on the Council of India until 1885, when he was elected principal of the University of Edinburgh. He has published *Life of Mahomet* (1858); *Annals of the Early Caliphrate* (1883); *Extracts from the Koran* (1880), and *The Mohammedan Controversy* (1897). W.M.C.

MUKDEN, same as Moukden. See Manchuria, Vol. XV, pp. 473, 474.

MULFORD, Elisha, theologian; was born at Montrose, Pennsylvania, on November 19, 1833, was graduated from Yale College in 1855, and studied at Andover Theological Seminary and at various German universities. He then entered the ministry of the Protestant Episcopal Church, and was rector of various parishes and was a conspicuous exponent of "broad church" principles. He was the author of two notable works, of singularly elevated thought and expression, namely, *The Nation; The Foundation of Civil Order and Political Life in the United States* (1870), a treatise on social and political order in the United States, and *The Republic of God* (1881), a scholarly treatment of the relations between scientific philosophy and the Christian religion. He was for some years a lecturer on Evidences of Christianity in the General Theological Seminary of the Protestant Episcopal Church. He died at Cambridge, Massachusetts, on December 9, 1885. W.F.J.

MULFORD, Prentice, journalist and author; was born on Long Island, New York, in 1834, and was engaged in journalism and authorship, at first in New York city and later in San Francisco, California. He wrote *The Swamp Angel; Life by Land and Sea*, and *Your Forces and How to Use Them*. He died in 1891. W.F.J.

MULHALL, Michael G., a British statistician; born in 1836, in Dublin, Ireland. He was educated in Rome, at the Irish College. He went to South America, and in 1861 founded the *Daily Standard* at Buenos Ayres, the first English daily on that continent. He was elected a member of the British Association and other honorary societies. He published *The Progress of the World* (1880); *Dictionary of Statistics* (1886–1892), and contributed to the *Contemporary Review*. Died in Ireland, Dec. 12, 1900.

MULLEIN, the common name of species of *Verbascum*, an Old World genus of *Scrophulariaceæ* or figworts. The most common species is *V. Thapsus*, which grows as a weed everywhere, and is clothed with a dense felt-like covering of white wool and bears a long dense spike of yellow flowers.

MÜLLER, Baron Ferdinand von, a German botanist and explorer; born in Rostock, Germany, June 30, 1825. He went to Australia in 1847 for the benefit of his health. Previous to his emigration he made an investigation of the vegetation of his native land. He spent the years 1848–52 in botanical exploration in Australia; in 1852 became botanist for Victoria, and during the next five years explored the northern part of Australia. He was appointed director of the Melbourne Botanical Garden in 1857, and remained in office until 1873, during which time he established the garden, now one of the finest in the world. He published *Fragmenta Phytographiæ Australiæ* (1862–77); *Plants of Victoria* (1865); *Flora Australiensis*, and other botanical works. He was knighted in 1870 by the King of Würtemberg. Died at Melbourne, Oct. 9, 1896.

MÜLLER, Friedrich, a Bohemian philologist; born in Jemnik, Bohemia, March 5, 1834. He studied at Vienna, where in 1869 he was appointed professor of comparative philology. He was the editor of the journal *Wiener Zeitschrift für die Kunde des Morgenlandes*, and the author of *Elements of Philology* (1888); *Ethnography of the World* (1873), and essays on African, Asiatic and American languages.

MÜLLER, George Friedrich, a German-English philanthropist; born in Kroppenstadt, Prussia, September 27, 1805. He removed to London in 1829, and three years later settled in Bristol, where in 1836 he established the Bristol Orphan Home. By 1875 over 2,000 children were lodged, fed and educated, and $3,750,000 had been received in donations. Müller visited Europe, America and Asia on Evangelistic tours. He also established the Scriptural Knowledge Institution. Hundreds of thousands of Bibles were distributed, and more than one hundred millions of tracts, were circulated. Müller published *A Narrative of Some of the Lord's Dealings with George Müller*. In 1886 he went to Queensland to preach. He died in Bristol, England, March 10, 1898. W.M.C.

MÜLLER, Max. See Max-Müller, in these Supplements.

MÜLLER, Wilhelm, a German poet; born at Dessau, Oct. 7, 1794, studied philology and history at Berlin, keeper of the Ducal Library of Dessau to the time of his death, Sept. 30, 1827. He published *Rom, Römer und Römerinnen* (1820); *Gedichte*, newly edited in 1868 by his son, Max-Müller; *Neugriechische Volkslieder* and *Lyrische Reisen, Epigrammatische Spaziergänge* (1827), and *Bibliothek Deutscher Dichter aus dem 17th Jahrhundert* (10 vols., 1822–27). Many of his poems were set to music by Franz and Schubert. G.A.S.

MÜLLER, Wolfgang, a German poet; born in Königswinter, Prussia, March 5, 1816. He was a

medical student at Berlin and Bonn. His best known poem is perhaps *The May Queen* (1852). He also wrote *Stories of the Rhine* (1874); *Prince Minnewein* (1854); *John of Werth* (1858); and a number of dramas. Died at Neuenahr, Prussia, June 29, 1873.

MÜLLER'S GLASS OR HYALITE, a variety of opal. See MINERALOGY, Vol. XVI, p. 405.

MULLION. See ARCHITECTURE, Vol. II, p. 411.

MULOCK, DINAH MARIA. See CRAIK, DINAH MARIA MULOCK, in these Supplements.

MULTATULI, pseudonym. See DEKKER, EDWARD DOUWES, in these Supplements.

MULTIPHONE, a machine devised by Emil Berliner (the inventor of the Berlin transmitter and the gramophone, or talking machine), is a development of the gramophone, made by playing simultaneously from a number of copies of the same record, the loudness being proportional to the number of records used. Mr. Berliner was born in Hanover, Germany, May 20, 1851, but came to this country in 1870, and has lived in Washington, D. C., since 1882.

MULTIPLE OF ELECTRIC UNIT. See ELECTRICITY, Vol. VIII, p. 18.

MÜNCH-BELLINGHAUSEN, ELIGIUS FRANZ JOSEPH, BARON VON, known as a dramatist under the name of "Friedrich Halm"; born at Cracow, April 2, 1806. He was, in 1845, first keeper of the Imperial Court Library of Vienna, from 1862–70 intendant-general of the Hofteather. He died May 22, 1871. He wrote the dramas *Griseldis* (11th ed., 1896); *Sohn der Wildniss* (1843); *Der Fechter von Ravenna* (1857); the tragedies *Sampiero; Imelda Lambertazzi;* and the comedies *Verbot und Befehl* and *Wildfeuer* (1896). G.A.S.

MUNCIE, a city of Indiana; has a city hall, court-house, public library, good railroad facilities, two national banks, the largest flour-bagging factory in the United States, and some minor manufactures. Pop. 1900, 20,942. See also MUNCIE, Vol. XVII, p. 29.

MUNDT, KLARA MÜLLER, pseudonym "LOUISE MÜHLBACH," a German novelist; born in Neubrandenburg, Germany, Jan. 2, 1814; married in 1839 to Theodor Mundt, librarian of the University of Berlin. She wrote a large number of light novels, mainly historical, very popular among certain classes, the best known being *Frederick the Great and His Court* (1853). Died in Berlin, Sept. 26, 1873.

MUNGER, THEODORE THORNTON, an American clergyman; born in Bainbridge, N. Y., March 5, 1830. He graduated at Yale in 1851, and at Yale Theological Seminary in 1855. He has been pastor of Congregational churches in Dorchester, Mass., 1856–60; Haverhill, Mass., 1862–70; Lawrence, Mass., 1870–75; San José, Cal., 1875–76; North Adams, Mass., 1876–85; and since then of the United Church, New Haven, Conn. E.E.T.

MUNGOOS, MONGOOS, OR MONGOOSE. See ICHNEUMON, Vol. XII, p. 665.

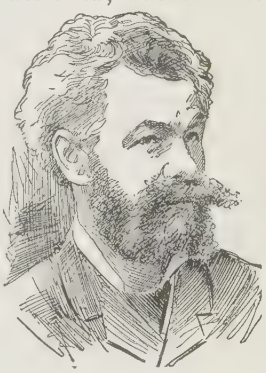
MUNICIPAL LAW, that system of law which a nation, state, or community establishes for the government of its own people, including criminal law, civil law, military law, and their subdivisions. It is distinguished from international law, which is the system of rules established for the purpose of controlling the acts of all civilized nations to a certain extent; while municipal law is distinctively the law of one nation or state, and affects only its own citizens or those within its territory. In any one nation the municipal law of another nation is foreign law. See LAW, Vol. XIV, p. 355, and its branches, such as *Constitutional, Criminal,* and *Civil* law.

MUNJEET OR MUNJIT. See MADDER, Vol. XV, p. 177.

MUNK, SALOMON, a German educator and author; born in Glogan, May 14, 1805, of Hebrew parentage. He early devoted himself to a study of the Jewish race, and after graduating at Berlin he went to Paris where he became professor of Hebrew in the College of France. His principal works were *The Culture of the Ancient Hebrews* (1833), and *A Visit to Palestine* (1845). He died in Paris, February 6, 1867. W.M.C.

MUNKACS, market town of Hungary, at the foot of the Carpathians, 101 miles N.E. of Debreczin; has mines of iron and rock crystals, called Hungarian diamonds. The citadel, built on an isolated height, resisted the imperial arms for three years (1685–88). In 1848 it fell into the hands of the Hungarians, and was captured by the Russians in 1849. It is now a state prison. Pop. 9,601.

MUNKACSY, MIHALY, a Hungarian painter, whose real name was Michael Lieb, was born at Munkacs, Hungary, Oct. 10, 1846, and died at Bonn, Germany, May 1, 1900. Studied painting at Vienna, Munich, and at Düsseldorf, and in 1872 settled in Paris. Except a few portraits, his works are nearly all genre pictures. Three classes may be distinguished — those depicting Hungarian life, mostly very dark in coloring; those illustrative of the social life of Paris, much lighter and brighter in tone; and historical pieces, of which the best known is *Christ Before Pilate.* His works include *The Last Day of a Man Condemned to Death* (1867); *The Night Prowlers* (1874); *The Village Hero, Hungary* (1875); *The Interior of a Studio* (1876); and *Christ on Calvary.* His *Milton Dictating Paradise Lost* is in the Lenox Library, New York.



MIHALY MUNKACSY.

MUÑOZ, JUAN BAUTISTA, a Spanish historian; born in Museros, Spain, in 1745. He was educated at Madrid University, and his erudition led to his being appointed cosmographer of the Indies. In this capacity he began a history of America, of which he published only one volume, entitled *Historia del Nuevo Mundo.* He died in 1799. E.E.T.

MUNSTERBERG, HUGO, professor of psychology in Harvard University. He was born in Dantzic, Germany, June 1, 1863, and is a graduate of the Dantzic Gymnasium and took post-

graduate studies in philosophy, natural science and medicine in Leipsic and Heidelberg, taking the degree of Ph.D. Leipsic (1885) and M.D. Heidelberg (1887). He was assistant professor of psychology at Freiburg in 1887. He is the author of several psychological works. W.R.B.

MUNTANER, R., a Catalonian chronicler. See SPAIN, Vol. XXII, p. 377.

MUNTZ'S METAL. See COPPER, Vol. VI, pp. 310, 311.

MUNYCHIA, a hill and harbor of Athens (q.v., Vol. III, p. 5). Also name of an annual festival. See ARTEMIS, Vol. II, p. 562.

MUR, river. See ALPS, Vol. I, pp. 545–554.

MURAD, Sultans of Turkey. See AMURATH, Vol. I, pp. 685, 686.

MURAL CIRCLE, an astronomical instrument for the observation of celestial bodies at their meridian passage. It consists of a large metal circle, turning on an axis the end of which projects from a solid stone pier or wall (whence the name), close to which the circle moves. The plane of the circle is set as nearly as possible in the meridian. Fixed immovably to the circle is a telescope, which by turning the circle is made to point to the star to be observed at the time of its meridian passage. Two wires, one fixed and one movable, similar to those in the transit circle, enable the altitude or zenith distance of the star to be noted, if the instrument has been adjusted properly and if the zenith or horizontal point on the circle be known. See GRADUATION, Vol. XI, pp. 25, 26.

MURAVIEFF, ALEXANDER, a Russian soldier; born in 1792. He was sent to Siberia for conspiracy in 1825 but was pardoned. He died in Moscow in 1864. W.M.C.

MURAVIEFF, AMURSKY NIKOLAI NIKOLAIEVITCH, COUNT, a Russian soldier; born in St. Petersburg in 1809. In 1828 he became governor of Eastern Siberia. He died in Paris, November 19, 1881. W.M.C.

MURAVIEFF, ANDREW, a Russian historian; born in 1798. He wrote *Pilgrimages to the Holy Places of Russia* (1831); *Four Centuries of Christianity* (1840), and *Souvenirs of the East* (1851). He died in St. Petersburg in 1874. W.M.C.

MURAVIEFF, KARSKI NICHOLAS, a Russian soldier; born in Smolensk in 1793. He participated in the French and Persian campaigns, the Russo-Turkish War and in the Crimea. He was known as "Prince of Kars." He died in St. Petersburg in 1856. W.M.C.

MURAVIEFF, MICHAEL, a Russian scholar; born at Smolensk, October 25, 1757. He was rector to the University of Moscow in 1796. He wrote a manual of ethics in 1810, which is a classic in Russia. He died July 29, 1807. W.M.C.

MURAVIEFF, MIKHAIL NIKOLAIEVITCH, a Russian soldier; born in Smolensk in 1795. He became a major-general in 1830 and was made military governor of Grodno. In 1850 he was a member of the Council of State. He died near Lugi, September 10, 1866. W.M.C.

MURAVIEFF, NIKOLAI JEROFEYEVITCH, a Russian mathematician; born in 1719. He wrote the first Russian algebra. He died in 1770. W.M.C.

MURAVIEFF-APOSTOL, IVAN, a Russian diplomat and scholar; born in 1796. He translated the Latin classics into Russian. He died in 1851. W.M.C.

MURAVIEFF, COUNT MICHEL, Russian Minister of Foreign Affairs; was born in 1845 and died at St. Petersburg, June 21, 1900. He was educated at Poltava and at Heidelberg; in 1864 he was attached to the Russian Embassy at Berlin, and ten years later became secretary of legation at Stockholm. In the same capacity, he served successively at The Hague, at Paris, at Berlin, and at Copenhagen. In 1897, he succeeded Prince Lobanoff as minister of foreign affairs at St. Petersburg, and commanded by his abilities the confidence of the Tsar, the court, and the cabinet. He was a true Russophile, and did much to further the interests of Russian diplomacy. His family has long played a distinguished part in Russian history. The present member of it has long been distrusted by English diplomats.

MUREX, a genus of gasteropod mollusks typical of the family *Muricidæ*. See MOLLUSCA, Vol. XVI.

MUREXIDE, a substance once used as a dye, and from its color called for the *Murex* or purple-fish.

MURFREE, MARY NOAILLES, novelist, best known by her pen-name of CHARLES EGBERT CRADDOCK; was born near Murfreesboro, Tennessee, on January 24, 1850. She began writing novels of life in the Tennessee mountains, and for years her identity was entirely concealed beneath her pen-name. Her works include *Where the Battle Was Fought* (1884); *Down the Ravine* (1885); *The Prophet of the Great Smoky Mountains* (1885), her masterpiece; *In the Clouds* (1886); *The Story of Keedon Bluffs* (1887); *In the "Stranger People's" Country* (1891); *His Vanished Star* (1894); *The Mystery of Witchface Mountain* (1895), and *A Spectre of Power* (1903). W.F.J.

MARY N. MURFREE.

MURFREESBORO, a city and the capital of Rutherford County, Middle Tennessee, 30 miles S.E. of Nashville; on the Nashville, Chattanooga and St. Louis railroad; from 1819 to 1826, capital of the state. It has several mills and factories. Population 1890, 3,739 1900, 3,999.

MURFREESBORO, BATTLE OF, Murfreesboro, Tennessee (q.v.), was the scene of three encounters during the Civil War. The first of these was slight and of little import. The town was occupied by a force of 1,400 Federal troops under Crittenden, who were attacked suddenly by the Confederate cavalry under Forrest and were driven out. The only benefit to the Confederates was the capture of a quantity of supplies. The second, and that which is generally known as the

Battle of Murfreesboro, was fought Dec. 31, 1862, and Jan. 1 and 2, 1863, between the Federals under Rosecrans and the Confederates under Bragg. Rosecrans had 43,000 men and Bragg about 62,000. Both armies, it was thought, had gone into winter quarters, when Bragg was surprised to find that Rosecrans had advanced from Nashville and hurriedly concentrated his force near Murfreesboro, on Stone River. The right wing of the Confederates was commanded by Breckenridge, the left by Hardee, and the center by Polk. The Federal left was under Crittenden, the right under McCook and the center under Thomas. Each hastened to attack, hoping to surprise the other. Bragg, however, made the first assault, driving the Federal left across the river, and was stopped only by the heavy battery fire from Sheridan's artillery. Sheridan, too, was obliged to retreat. Rosecrans gathered his forces on higher ground and there made a successful stand. During the next two days, storms prevented serious fighting, and Bragg retired January 4th. The losses to the Federals in killed, wounded and missing were about thirteen thousand; to the Confederates, about ten thousand.

The third encounter occurred near Murfreesboro June 23–30, when Rosecrans drove Bragg from an entrenched position on the Duck River.

MURIATIC, same as HYDRO-CHLORIC ACID. See CHLORINE, Vol. V, p. 589.

MURIDÆ, a family of rodents. See MAMMALIA, Vol. XV, p. 423.

MURPHY BUTTON. See SURGERY, AMERICAN, in these Supplements.

MURPHYSBORO, a city and the capital of Jackson County, southern Illinois, 50 miles N. of Cairo, on the Mobile and Ohio, the Chicago and Texas and the St. Louis, Alton and Terre Haute railroads, on Big Muddy River, 15 miles E. of the Mississippi River. It is in a rich bituminous coal-field, has quarries of fine building-limestone and manufactories of flour, fire-brick, lumber, ice, mineral waters and cigars. Population 1890, 3,880; 1900, 6,463.

MURRAY, ALEXANDER, a British philologist; born in Dunkitterick, Scotland, October 22, 1775. As a shepherd boy he became self-educated, acquiring a knowledge of English literature and of the classics; learned the principal European tongues and Hebrew, Latin and Greek. The fame of the learned shepherd reached Edinburgh, where he obtained a bursary at the university. Here he continued his linguistic labors, which were extended to the Oriental tongues. In 1806 he became a preacher of Urr, and in 1812 was appointed professor of Oriental languages in Edinburgh University. His works include *Outlines of Oriental Philosophy* (1812), and *History of the European Languages*, the latter published after his death with an *Autobiography* (1823). He died in Edinburgh, April 15, 1813. W.M.C.

MURRAY, ALEXANDER STUART, a British archæologist; born in 1841, in Edinburgh; educated in the University of Edinburgh and the University of Berlin. He was connected, officially, with the British Museum after 1867, first as assistant and after 1886 as keeper. He was a constant contributor to periodicals and journals upon archæological subjects. His best-known works are *History of Greek Sculpture* (1883); and *Handbook of Greek Archæology* (1892). He contributed a number of articles to this ENCYCLOPÆDIA, among them ACHILLES, ARCHÆOLOGY and GEMS.

MURRAY, DAVID, an American author and educator; born in Bovina, Delaware County, New York, Oct. 15, 1830. He was graduated from Union College in 1852. From 1857 to 1863 he was principal of the Albany Academy, and from 1863 to 1873 was a professor in Rutgers College. He was adviser to the Imperial Minister of Education in Japan until 1879 when he became secretary of the University of the State of New York. He has written *History of Education in Japan* (1876); and *The Story of Japan* (1894). W.M.C.

MURRAY, DAVID CHRISTIE, an English novelist; born in West Bromwich, April 13, 1847. He served as reporter and then as war correspondent for the *Scotsman* and *Times* in the Russo-Turkish War. In 1879 he published *A Life's Atonement* in *Chambers' Journal*. Other works are *By the Gate of the Sea* (1882); *A Dangerous Catspaw* (1889); *Bob Martin's Little Girl* (1892); *A Wasted Crime* (1893); *The Making of a Novelist* (1894); *The Martyred Fool* (1895).

MURRAY, JAMES AUGUSTUS HENRY, an English philologist; born in Denholm, Scotland, in 1837. He received his elementary education at Minto school, and afterward graduated from London University; removed to Hawick and was appointed assistant teacher in the parish school there, and afterward master of a subscription academy. He next removed to London, filling the post of foreign correspondent in the Oriental bank for some years; he afterward became senior assistant master at Mill Hill school. The great work of his life, the editorship of the Philological Society's *New English Dictionary*, was begun while at Mill Hill, an iron building in his garden there being utilized for the assortment of the two tons of material to which he fell heir from his predecessors in the editorship, Herbert Coleridge and Dr. Furnivall. This work has been continued at Oxford, where Dr. Murray, with a staff of assistants, has devoted his whole attention to the task. Among his writings are *The Complaynt of Scotland* (1872); *The Dialect of the Southern Counties of Scotland* (1873); and the *Romance and Prophecies of Thomas of Ercildoune* (1875). He is also the author of the article on the ENGLISH LANGUAGE, in this ENCYCLOPÆDIA.

MURRAY, SIR JOHN, British naturalist; born in Coburg, Canada, in 1841; graduated from the University of Edinburgh, and on account of his studies in marine history was appointed geologist to the *Challenger* expedition under Sir Wyville Thomson. He was scientist in charge of the *Triton* and *Knight Errant* explorations in the North Atlantic deep seas. He contributed to various science journals; but his main publications have been in the reports of his deep-sea explorations. He was knighted in 1898. See GEOLOGY, Vol. X, pp. 255, 260; and PACIFIC OCEAN, Vol. XVIII, p. 133. He is the author of

the articles on NORTH SEA, PACIFIC OCEAN and NORWEGIAN SEA, in this ENCYCLOPÆDIA.

MURRAY, LINDLEY, an American lawyer and author; born in Lancaster County, Pennsylvania, April 22, 1745. He received his primary education in Philadelphia in the academy of the Society of Friends. He afterward studied law and practiced as a barrister; but quitted the bar for the counting house, and having realized a competency, went, in 1784, to England and settled at Holdgate, near York. In 1787 he published his *Power of Religion on the Mind*, which passed through twenty editions. His *Grammar of the English Language* was published in 1795 and was followed by *English Exercises*, the *Key*, the *English Reader*, *Introduction and Sequel* and a *Spelling Book*. Murray's *Grammar* was introduced as a text-book in England and the United States, and for years was regarded as a standard authority. An abridged edition (1818) went through 150 editions. He died in Holdgate, England, February 25, 1826. W.M.C.

MURRAY BAY, a picturesque watering-place in Charlevoix County, Quebec, on the St. Lawrence River, 90 miles E. of Quebec. It has lumber-mills. Population of parish in 1901, estimated, 3,400.

MURSKA, ILMA DE, a Bohemian opera-singer; born in Buda-Pesth, Hungary, in 1836. She was trained in Paris by Madame Marchesi; first sang in public in Florence, Italy, in 1862, and appeared in London in May, 1865, as Lucia in *Lucia di Lammermoor*. In 1873 she sang in opera in New York, and her last appearance in the United States was in 1887. She was married in 1875 to Alfred Anderson, and again in 1876 to T. J. Hill. Her voice was a soprano, and her best representation Senta in the *Ollandese Dannato*. She died in Munich, Bavaria, Jan. 14, 1889.

MUSCADINE GRAPE, the *Vitis vulpina* of the southern United States, where it is also known as bullace or fox-grape. Its fruit is large, purple, thick-skinned and musky, and is the original of the Scuppernong grape and other cultivated varieties.

MUSCATINE, a city and the county seat of Muscatine County, Iowa, in the eastern part of the state. It lies on the Mississippi River, 25 miles west of and below Davenport, Iowa, and Rock Island, Illinois, and is reached by the Burlington, Cedar Rapids and Northern and the Chicago, Rock Island and Pacific railroads. It is essentially an industrial and commercial city, its manufactures being of great extent and variety. Trade is conducted by both river and rail, this being one of the chief shipping points on the Iowa shore of the Mississippi River. The population of the city was 11,454 in 1890 and 14,073 in 1900. See also MUSCATINE, Vol. XVII, p. 71. W.F.J.

MUSCLE. See ANATOMY, Vol. I, pp. 731–738.

MUSCLE-SUGAR. See INOSITE, in these Supplements.

MUSCOGEE OR CREEK INDIANS. See INDIANS, Vol. XII, pp. 868, 871.

MUSCOVITE. See MINERALOGY, Vol. XVI, p. 430.

MUSCULAR-SENSE. See TOUCH, Vol. XXIII, p. 513.

MUSEUM (Gr., *mouseion*), originally the name given by the ancients to a temple of the Muses and afterward to a building devoted to science, learning and the fine arts. The first museum of this kind was the celebrated Alexandrian Museum, a meeting-place for learned men, and a library, founded about 280 B. C., in the palace. After the revival of learning in Europe the term museum came to be applied to collections of antiquities and sculptures and paintings. Collections illustrative of natural history and other sciences now form a chief part of the treasures of many of the greatest museums, and there are museums devoted to particular branches of science, and to illustrating the industrial arts. The British Museum and that of South Kensington in London, the museums of the Vatican in Rome, of the Louvre in Paris, of St. Petersburg, Dresden, Vienna, Munich and Berlin, Boston Museum of Fine Arts, and the National Museum at Washington, are among the greatest in the world. For art galleries, see SCHOOLS OF PAINTING, Vol. XXI, pp. 465–468; see also BRITISH MUSEUM and NATIONAL MUSEUM, in these Supplements.)

MUSICAL SIGNS. See MUSIC, Vol. XVII, pp. 87–89.

*MUSIC IN AMERICA. While it is true that America has not yet produced a great American composer, it has, nevertheless, a copious and important musical history. Of the music of the American aborigines little need be said. The organization of Indian society by gentes and phratries afforded little opportunity for individual development, hence the emotional nature of man did not seek musical expression extensively. With the exception of some love-songs, which indicate the dawn of individuality—for instance, the Bethæ Wa-an and Wa-oo Wa-an of the Omahas—and show some development of tonality, the great bulk of American Indian music showed, like that of all primitive races, a strong preponderance of rhythm and but little tone, melody or harmony. But there was sufficient progress already to produce some vocal music without words; that is, songs which were chanted to mere vowel sounds, stripped of harsh consonant explosives, and used only to carry the tone, but having no meaning as words.

The distance between traditional European music which the colonists brought with them, and that of the Indian, was too great to allow any influence of the latter upon the former. American music is simply an importation or adaptation of the music of Europe.

Beginning in 1620, several distinct and well-defined epochs can be traced, each showing an advance over that which preceded. It is important to note that this rise for more than two hundred years made its way against the greatest obstacles. The cause and manner of its first development are of prime importance in arriving at a just comprehension of the present musical status of America.

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PSALMODY. American music found its origin in psalmody, and the history of music from that time is but the history of struggles from nothing to the final establishment of choir-singing in 1790. Psalm-singing was an integral and important part of Puritan worship methods. At first, rude recitatives replaced the old and forgotten tunes, and slowly a new set of tunes began to take their place. After a time rude music was introduced, consisting merely of a succession of notes undivided by bars. A century passed before music, in anything approaching its modern acceptation, made its appearance. In 1721 the first music printed with bars appeared. This was *The Grounds of Music Explained; or, An Introduction to the Art of Singing by Note. Fitted to the Meanest Capacity. By Rev. Thomas Waller, of Roxbury, Massachusetts.* By this time psalmody had taken firm root, and the growth of it is to be traced plainly to the present day. While music was in this crude state in America, Monteverde in Italy was originating opera; in England Purcell was re-establishing the nearly lost and grand old art of church-music; in Germany Haydn and Mozart were filling the land with melody, and Handel and Bach had already done their work. But it must be remembered that in the Old World progress was being made from long-established foundations and in many lines, while in the New everything had to be originated, and not only that, but along a single, narrow path sternly limited by harsh theological restrictions. Even at this time such books as that of Dr. Waller were intended for the voice alone, and instrumental music was looked upon as a satanic device.

Still we find Edward Bromfield, Jr., building the first organ as early as 1742 in Boston, and in 1773 we hear of Josiah Flagg as leading a band. Flagg was composer, publisher, performer, manager and leader. He gave a series of performances in Faneuil Hall, at one of which he had as many as fifty performers.

With William Billings began actual musical progress. Billings was the first original composer of America, and the pioneer of a new era of advance. He was born in Boston, in 1746, and died in 1800. He was a tanner by trade, and attending the singing-schools which at that time were flourishing, became restless and dissatisfied with the existing music. He found it stiff and formal, and sought to expand it by giving expression to what he called "spontaneous melody." He was entirely self-educated, and made his own unaided attempts at contrapuntal writing. It is told of him that his first compositions were written on the sides of leather in his tannery with a piece of chalk. In 1770 he published his first book, *The New England Psalm Singer or American Chorister.* Crude and faulty as these compositions undoubtedly were, they nevertheless marked a distinct advance of an original type. Then came the War of the Revolution, and with it a new development in music. Intense hatred of everything British sprang up, precisely as a similar hatred had actuated the early Puritans, and with the tea the old British psalm-tunes were pitched overboard. Billings now began to write paraphrases of the psalms into politico-patriotic hymns, which were instantly taken up by the people. One of the best and best-known of these, *Chester*, was often heard played on the fifes as the Revolutionary troops went into battle. These songs and hymns were essentially the first American folk-songs. They possess especial characteristics of virility and originality. They broke down the narrow barriers which thus far had confined musical advance, and laid foundations for progress along many lines. Billings was not alone in this work. Contemporary with him or immediately following him are found Andrew Law, Jacob Kimball, Oliver Holden, Samuel Holyoke, Daniel Read, Timothy Swan, Jacob French, Oliver Shaw, Babcock, Dutton, Lee, King and many others.

REACTION. With the dawn of the nineteenth century a reaction began to be strongly felt. The old singing-schools had developed into musical societies, and there are extant accounts of essays delivered before the Handel Society of Dartmouth College, which assail the then prevailing style of church-music and demand music free from the extravagances which, not unnaturally, characterized the work of Billings and his school. Progress up to 1820 was fairly steady. In that year we find E. Riley publishing in New York, *Vocal Melodies, Arranged for the Piano;* and in Kentucky A. C. Heinrich published *The Dawn of Music.* Outside of New England, where American music was born, some advance, meanwhile, was being made. In 1750 *The Beggars' Opera* had been performed in New York, and for some years after the War of the Revolution English opera had a fitful existence in New York and Philadelphia, and also, to a less extent, in Baltimore and Charleston. There was a revival of interest in 1793–94. In 1810 Charles Geifert, leader of the Park Theater orchestra, attained some prominence as a composer of music for plays. It was in New England, however, that the characteristic advance was made. As Billings had broken away from the conditions about him and given a new direction to musical effort, so now a second original American musician and composer appeared. Lowell Mason was born in Medfield, Massachusetts, in 1792, and died in 1872, having lived to witness the growth and success of his earliest efforts. In 1822 he published his first book of church-music as *The Boston Händel and Haydn Society Collection of Music.* In 1826 he began lecturing on music and developing his great central idea, which was the necessity for the diffusion of true musical knowledge among the people by the teaching of music in the public schools. The old Puritan spirit was still alive, and he met with opposition. In 1836 the Boston School Board voted in favor of his proposition, but the board stopped there and refused to make an appropriation to carry out the plan. Mason at once offered to pay all the expenses for one year, and did so. The result was such that thereafter the teaching of music became an important part of the public-school education.

Then Mason developed a plan of conventions or gatherings of teachers, then of the professors, and, finally, established the great conventions, which have ever since done so much toward forwarding the progress of music. To him, too, is fairly due the introduction of serious chorus-work. As has been said, the earliest operatic representation was that of John Gay's *The Beggars' Opera*, in New York, in 1750. In 1823 was produced a distinctively American opera, one melody of which is known wherever music itself is known. In that year John Howard Payne's dramatic opera, *Clari, the Maid of Milan*, was produced. In it is found *Home, Sweet Home.*

In 1827 an effort was made to produce *Der Freischütz.* It was rendered imperfectly. In the same year Manuel Garcia brought Italian opera to New York. He made a success, and this encouraged Da Ponte to build an opera-house. The result was disastrous. The season of eight months yielded receipts of $29,275, with expenditures of $81,055.

Oratorio. Better progress was made along this line, which was the more natural sequence to the old psalmody and church-music. In 1798 Gottlieb Graupner settled in Boston, and Trajetta came to New York the year following. In 1810 Graupner organized a Philharmonic Society, which was in existence for twelve years, and which was the beginning of orchestral music in America, and paved the way to oratorio. March 30, 1815, Graupner, Thomas Smith and Asa Peabody organized the Boston Handel and Haydn Society, which afterward, by taking up Lowell Mason's work and assisting him, really opened the way to the successful development of American music. On Christmas of 1815 that society gave its first "grand oratorio," with the Russian consul, Eustaphieve, among the performers. The audience numbered 945. There were 100 voices in the chorus and less than a dozen instruments in the orchestra. Selections from Handel's *The Creation* and *The Messiah* made up the programme. In 1823 it presented *The Messiah* complete. This same year saw the real beginning of classical sacred music in New York in the foundation of the Choral Society.

Dawn of Modern Epoch. The dividing date is 1840. It is now difficult to follow out the separate lines of progress. Lowell Mason's work was bearing rich fruitage already. There was a distinct musical spirit among the masses as its result, and development was correspondingly rapid. In 1843 Palmo built a new Italian opera-house in New York, which, by 1847, was too small, and, four years later, Foster, Morgan and Colles built an opera-house in Astor Place. There were 150 subscribers to 75 nights of opera a year for five years. The opening presentation was *Ernani*, and the five years resulted in a great financial success. So great was it that, in 1853, the building of the Academy of Music was begun. It cost $350,000, and was opened in 1858. It professedly was to be an academy for the promotion of the study of music and the encouragement of original thought by the study of Italian opera. It was a failure from the outset. The reasons are not far to seek, and are well expressed by W. S. B. Mathews, to whose *Hundred Years of Music in America* this article is indebted. He says: "Italian opera is not adapted to flourish in this country. It is a mistake, we apprehend, to suppose, as some assume, that our people are musically incompetent to appreciate the higher forms of art. The sterling and substantial progress of oratorio, for instance, and of English opera, proves the contrary. The difficulty is to be looked for in the fact that the genius and instinct of our people are wholly at variance with that on which Italian opera is based, nor is it at all possible to assimilate our art education to an appreciation of such features of Italian opera as are little short of repugnant to our tastes and sensibilities. The success of Italian opera must, therefore, always remain of a transitory nature. It is based rather upon sensual or intellectual appreciation than upon spiritual grounds."

The Academy did try to develop distinctively American music. In 1855 Ole Bull was the lessee and manager, and offered a prize of $1,000 for "the best original grand opera by an American composer upon *a strictly American subject.*" But the Academy failed the year following. Max Maretzek then continued Italian opera in a desultory way.

The year 1856 is to be noted for an eminently successful season of German opera. In 1853 Jullien came from New Orleans with his spectacular orchestra. With him were many musicians who afterward made their mark in American musical history. Jullien heartily encouraged American composers, and frequently produced original works. Among the most important during his New York season were compositions, among others, by H. W. Fry and T. Bristow. Jullien's orchestra comprised sixty performers. At this same time Barnum was presenting Jenny Lind to the American public.

The next important epoch was that of the Civil War. Then the true American folk-songs sprang into full existence. Both North and South contributed to these. These compositions were not martial only in tone, but covered the whole field of the mournful, the sentimental, etc. Francis Scott Key's *Star-Spangled Banner*, written in 1814, took new life, and Henry Clay Work produced *Marching Through Georgia.* There was a great trio at work at this time: Lowell Mason, William B. Bradbury and Dr. George F. Root. Root's *Battle-Cry of Freedom* became as widely known as Work's great martial song.

Up to the opening of the war, Boston and New York were the centers of musical activity; but in 1865, when the war closed, this activity was transferred to Cincinnati and Chicago. Before examining this new phase, which might be called the modern epoch, it is necessary to go back a little and rapidly glance over the work of a number of important composers and the effect produced by virtuosi and the manufacture of instruments. Be-

longing to the *post-bellum* period really, although born in 1816 and dying in 1868, was William Batchelder Bradbury, who deserves to be known as the melodist among American psalmodists. His principal work is the sacred cantata, *Esther*, which has been presented innumerable times with unvarying success. His contemporary, Isaac B. Woodbury (1819–1858), should also be reckoned with him. Root and Work have been mentioned. Other workers in this field were Charles Carroll Sawyer, Luther Orlando Emerson and Horatio Richmond Palmer. Two American composers of this period emphasized and accentuated the old psalmodic spirit, and won instant recognition from the American people. These were Philip Paul Bliss, author of *Hold the Fort*, *Pull for the Shore*, *Rescue the Perishing*, etc., and J. P. Webster, whose *Sweet By-and-By* was sung by millions. In connection with these compositions should be noted the instantaneous success of Stephen Collins Foster, author of *The Old Folks at Home.*

The effect of the perfection of the piano is a factor in the growth of American music that cannot be over-estimated. The appearance of Thalberg in 1855 may be said to have begun this influence, which was modified and strengthened by Gottschalk. Among the pioneers are Rubenstein, von Bülow, Mme. Essipoff, Mme. Rivé-King, Teresa Carreño and Joseffy. The perfection to which Chickering and the Steinways brought the piano, adding to its value as a means of interpreting music, assisted materially in the spread of musical spirit, appreciation and ability among the people. The recent triumphs of Pachman, of D'Albert, and yet more notably of Paderewski, show that these qualities are as fully alive in America as anywhere on the globe. In this connection the tremendous advance in organ-playing must be noted. As its most prominent exponent, Clarence Eddy's famous feat of giving a series of 100 organ recitals, extending over a period of two years, at which more than five hundred separate compositions, many of them of American origin, were presented without any duplication, had tremendous effect in advancing organ-playing.

Belonging partly to this epoch and partly to the modern one are the great choral societies of the country, which began their work about 1865, and have done more, perhaps, than any other one cause to make good music popular and arouse a desire for musical cultivation among the masses of the people. The Handel and Haydn Society of Boston began in 1867 to give triennial festivals. The North American Sängerbund, consisting of numerous German singing-societies scattered all over the United States, inaugurated biennial meetings with choral concerts. Great festivals were held in Cincinnati, Chicago, and other cities, notably the splendid Peace Jubilee and the May Festivals, the annual concerts of the Apollo Club of Chicago, etc. It is, perhaps, due to these societies more than to anything else that music has been introduced extensively in the curriculum of public schools.

Modern Epoch. Three names stand out brilliantly as those of the leaders, Thomas, Damrosch and Dvořák. Again it is necessary to retrace history a little. Theodore Thomas was the one who really opened the doors to the highest musical effort in America. In 1842 the New York Philharmonic Society was organized, and until 1866 it lived a precarious existence. In 1854 Theodore Thomas, with William Mason, Carl Bergmann, Theodore Matzka and Bernard Mollenhauer, began to give chamber concerts. In 1855 he inaugurated in New York a series of concerts in a garden near Central Park, and the following year at Central Park Garden. Thomas had in view the most important orchestral enterprise ever undertaken, and seized with avidity every opportunity of reaching the end which he had set before him. Thus we find him in 1864 organizing the first symphony orchestra. The Philharmonic Society from 1866 to 1876 was under the guidance of his associate, Carl Bergmann, who was followed by Doctor Leopold Damrosch. Theodore Thomas then began to guide its destinies. Anxious for the appearance of American music, he was persuaded to identify himself with Mrs. Thurber's unfortunate venture at so-called American opera. Within the last few years he has seen his highest hopes realized, and has brought together a perfect orchestra, competent to render the highest forms of music. He presented Wagner's *Ride of the Valkyries* and other important works of the same composer long before they were known to the general European public. He must not, however, be considered as a Wagner enthusiast, for he has also made known in the same way Berlioz, for example, and insists that Beethoven is to be placed as the head of all times and all schools in orchestral writing. He simply has recognized the dominant principle underlying American musical appreciation and due to its development.

His labors, so earnestly and sincerely carried on, opened fresh fields which soon were occupied. The Boston Symphony Orchestra was one of the first and best results. In 1875 Dr. Leopold Damrosch incorporated the Oratorio Society of New York, which he had organized two years before; and five years later, in 1878, he founded the New York Symphony Society. After Doctor Damrosch's death, in 1885, his son, Walter, assumed the work, and is now carrying it on most successfully. Ambitious efforts were made in the direction of producing grand opera, and they have of late been generally successful. The two great modern schools, arbitrarily called Italian and German opera, are represented in this country annually by two organizations composed of the greatest operatic artists that can be obtained, and second to no other aggregations of a similar character anywhere. However, the American public does not show enough taste for that class of performances to support such organizations permanently, as was instanced recently by the unsuccessful termination of the Metropolitan Opera-House enterprise of New York. The names most prominently connected with grand opera in the United States as

managers and conductors are Colonel Mapleson, Abbey, Schöfel and Grau, Leopold and Walter Damrosch, and Anton Seidl. Light opera and opera burlesque, on the other hand, find a rich field in America.

It is, perhaps, natural enough that there is not yet any characteristically American music. Even the national airs lack originality, and contain strong reminders of English and French motifs. An interesting, if not wholly successful, attempt to create a national style of music was made within the last few years by Antonin Dvořák, the Bohemian composer, whom the New York Philharmonic Society secured to take charge of its work. Dvořák considered the negro melody and harmony the most important element of an indigenous character as distinguished from the traditionary music of Europe, which had not been modified perceptibly in America. Upon that theory he composed a symphony, *In the New World*, not utilizing existing negro airs, but analyzing them and attempting to employ their elements in the construction of a new and ambitious work. In order to emphasize the American character of the work, he used Longfellow's *Hiawatha*, and attempted to reproduce its sentiment, not its story, in music. The result was a very beautiful piece of music, the second movement, which represents Hiawatha's journey through the primeval forests and his wooing of Minnehaha, being received with particular delight by the public. But candor compels the statement, that to the public not capable of analyzing and discovering scientifically the elements out of which the work was compounded, there was nothing in the music more suggestive of America than of any other country.

Two generations ago music in America was still in its infancy. To-day there are great colleges of music all through the country. Perhaps the most important of these are the New York Conservatory of Music, the Grand Conservatory of Music, the New York College of Music, the Metropolitan Conservatory of Music—all of New York; the Boston Conservatory of Music, the Chicago Musical College and the Chicago Conservatory of Music. One of the most surprising things to foreign musicians who visit the United States is the large number and earnestness of private musical study clubs that have sprung up everywhere. There are amateur orchestral associations of no mean ability. American singers have conquered places in the first rank of operatic performers. A peculiarity is that the popular topical songs produced in America are full of a native swing, although not characteristic in melody, which possibly points the direction in which national musical features will grow. Indications of local characteristics have appeared in the past and are occasionally found to-day, such as the quaint river melodies of the boatmen of some years ago. The work done, however, has been chiefly in preparation. Not that there has been a paucity of original composers, but that their attempts, for the most part, have been undertaken with insufficient tools. These deficiencies the great orchestral leaders have been supplanting with splendid equipments that ought to lead to the "land of promise."

A partial list of musicians who have seriously advanced American music is presented rather as an indication for the student than as a complete roster of American composers:

Gottschalk, Louis Moreau—Most important works, *Mancenillier; Chasse de Jeune Henri; Songe d'une Nuit d'Été*, and *Moissoneuse Mazurka* (1847); *Carnaval de Venise; Jerusalem; Chant du Soldat; Ricordati;* and *Valse Poetique* (1857); *Marche Solennelle; Minuit à Séville;* and *Reflets du Passé* (1858); *Manchega; Souvenir de la Havane; Ardennes; Jeunesse Mazurka; La Chute des Feuilles* (1860); *Polonia;* Caprice, *O Ma Charmante;* Caprice, *Suis Moi;* and *Berceuse* (1861); *La Colombe; Ojos Criollos; Miséséré du Trovatore; Reponds-moi; Overture to William Tell* (1864).

Mason, William—Various compositions for pianoforte.

Foote, Arthur—Some important chamber and orchestral music, particularly; overture, *In the Mountains*, produced in London, England.

Fry, William Henry—Opera, *Leonore* (1845); *Nôtre Dame de Paris* (1864).

Paine, John Knowles—*Mass in D*, produced in Berlin with great success (1861); oratorio, *St. Peter* (1873); music for *Œdipus Tyrannus*, several symphonies, and *The Tempest* (1881).

Buck, Dudley—Two Mottette collections; church-music, cantata, *Don Munio, Forty-seventh Psalm* (1874); cantata, *The Nun of Nidaros* (1878); cantata, *King Olaf's Christmas* (1887); light opera, *Deseret;* oratorio, *The Golden Legend* (1880); oratorio, *The Light of Asia* (1886).

Other composers who lately have produced important musical works are Charles Crozat Converse, Dr. Frederic L. Ritter, Silas G. Pratt, Frank Van der Stucken, George W. Chadwick, Edward A. MacDowell, and Frederick G. Gleason.

H. E. O. Heinemann.

MUSKEG, the name given the swamps of northern Michigan, Wisconsin, Minnesota and British Columbia. These swamps are in some cases a peaty stratum, formed on the surface of a lake by the interlacing of vegetable drift with aquatic plants, on which, in process of time, shrubs and even trees grow, and which are capable sometimes of supporting the weight of a railway. In other parts the water takes the form of a lake, underneath which is a deep bog, and in some places the peaty mass forms the whole swamp with no water beneath. In the Muskeg grow stunted pines, and upon ridges, which separate one portion of the swamp from the other, are good timber-trees. The Muskegs are inhabited by the moose, especially in the summer months.

MUSKEGON, a city and capital of Muskegon County, in western central Michigan, on the Chicago and West Michigan, the Grand Rapids and Indiana and the Toledo, Saginaw and Muskegon railroads. In 1891 its water-works system

was completed; in 1888 the Hackley public library, containing 20,000 volumes, was founded. The census reports of 1900 show that 200 manufacturing establishments, representing 50 industries, reported, with a capital of $4,602,390. Its lumber trade still remains one of the largest industries of the city. Population 1890, 22,702; 1900, 20,818. See MUSKEGON, Vol. XVII, p. 114.

MUSKINGUM RIVER, a considerable stream formed by the joining of several small ones in Coshocton County, Ohio, in the east-central part of the state, and flowing thence southward to the Ohio River at Marietta. It is navigable for nearly a hundred miles. W.F.J.

MUSKOKA RIVER a river of northwestern Ontario, Canada, rises in Nipissing district and flows W.S.W. through Muskoka Lake into Georgian Bay.

MUSPRATT, JAMES SHERIDAN, a British chemist; born in Dublin, Ireland, March 8, 1821. In 1837 he was appointed chemist for an English manufacturing company, and afterward studied at Giessen, Germany. He is best known in the scientific world for his investigations in ethyl and his discoveries in organic chemistry. He published *Outlines of Qualitative Analysis* (1849); *Dictionary of Chemistry* (1854); and a translation of the *Blowpipe*, by Plattner (1844). He died in West Derby, England, Feb. 3, 1871.

MUSQUASH, same as MUSKRAT, Vol. XVII, pp. 115, 116.

MUSSAFIA, ADOLF, an Austrian philologist; born in Spalato, Dalmatia, Jan. 15, 1834. In 1852 he began the study of medicine in the University of Vienna, but soon turned his attention to philology. In 1860 he became professor of the Romance languages and literature in the University of Vienna, and in 1868 assistant librarian of the Imperial Library in Vienna. He published a *History of the Romance Languages* (1862); *Memoir of Ancient French Poetry in the Library of St. Mark at Venice* (1863); *Studies of the Legends of Mary of the Middle Ages* (1891); and treatises on kindred topics.

MUSSULMAN. See MOHAMMEDANISM, Vol. XVI, p. 568.

MUSTAFA. Four Sultans of TURKEY, q.v., Vol. XXIII, pp. 686–690.

MUSTARD FAMILY. See CRUCIFERÆ, in these Supplements.

MUSTARD OIL. See OILS, Vol. XVII, 765.

MUSTELIDÆ. See MINK, Vol. XVI, p. 496.

MUT, an Egyptian goddess. See EGYPT, Vol. VII, p. 622.

MUTSUHITO, THE EMPEROR OF JAPAN, also known as the MIKADO, born at Kyoto, November 3, 1852. He succeeded to the throne in direct line from his father, Komeo Tenno, or Osahito, February 13, 1867, and was crowned at Osaka in 1868. The emperor's imperial title is Tenno but the appellation by which he is called in relation to external affairs is "Kotel," a word of Chinese origin. It is said that the Japanese trace the founding of their empire back to the first emperor, Jimmu Tenno, 660 B.C., and that the dynasty still reigns of which Mutsuhito is the one hundred and twenty-second incumbent in unbroken descent. When Mutsuhito ascended the throne there was still considerable agitation and unrest in the country following the concessions made to foreigners, as a result of the treaty concluded with Commodore Perry of the United States, in 1854, by which it was agreed that certain ports should be open to foreign trade. Notwithstanding the fact that the main opposition to the free interchange of trade with foreigners was on the ground that it would overthrow the primitive condition of affairs in which the will of the Mikado had been supreme, Mutsuhito approved of opening up the country to foreign intercourse and advocated many other far-reaching reforms. Consistent with this motive he invited the foreign representatives to an audience, March 23, 1868, and the following year pledged himself to certain reforms, one of which was the establishment of a deliberative assembly. His action inspired a spirit of patriotism in the daimios who, thereupon, surrendered their estates and special privileges to their sovereign, and thus sounded the death knell of feudalism that had held sway in Japan for many centuries. From this time the little island nation moved rapidly forward. In the building of railroads, the widening of commerce, the improvement of the common schools, and the introducing of English in the curriculum of the latter, Mutsuhito took an active and leading part. In the breaking out of war with China, in 1894, he manifested the deepest interest in the campaign, reviewed the troops as they left Japan for Korea and personally rewarded those winning distinction in the conflict. He had the honor of being the first Oriental sovereign forming a defensive alliance with a great European power, as noted in treaty with England. In the war waged with Russia, in 1904, he came to the front as one of the most famous rulers of the world. As the man who actually selected the officers that figured in the triumphs of land and sea and who in a measure supervised the work of the war board at Tokio, his discernment and efficiency were awarded unstinted praise. While the remarkable victories gained by his forces over the Russians may bespeak his worth, even greater credit is due his genius for the skill and wisdom exercised in advancing his people in freedom, loyalty and power, up to that standard of nationality which makes great achievements possible. A.R.R.

MUTTON-BIRD. See SHEARWATER, Vol. XXI, p. 818.

MUTUAL COMPANIES. See FIRE INSURANCE, in these Supplements.

MUTUAL INDUCTION. See ELECTRICITY, §71, in these Supplements.

MUZAFER ED-DIN, a Shah of Persia; born March 25, 1853. He was the second son of Shah Nasr ed-din (q. v., in these Supplements), who exercised the royal prerogative of leaving the crown to any member of his family he might select. The new Shah is the fifth sovereign of the Kajar dynasty, and a Turk by descent. This dynasty has

ruled in Persia for over a century. During the reign of his father he lived a retired life, and was not well known to the representatives of the foreign powers. He was enthroned at Teheran, June 8, 1896, and received the recognition of the powers and the homage of the chief officials of his kingdom. He was a pacific prince, without the despotic tendencies of his father. His elder brother, Zil-es-Sultan, governor of the province of Ispahan, was of lower birth and had a considerable following in his own province, but sent immediate assurances of his loyalty to the new Shah. The mother of the latter was the royal wife of the late Shah. When Muzafer was proclaimed Vali Ahd, or heir presumptive, he was, according to custom, made governor of Azerbaijan. He had in his youth for his tutor Mirza Nizam, who had been one of the most brilliant pupils of the École Polytechnique and of the École des Mines, of Paris. His own children, of whom he had 4 sons and 15 daughters, are born of wives of low rank and cannot succeed to the throne.

MUZÁKOVÁ, Johanna, the wife of Professor Peter Mûzák of Prague, and who is better known as Karolina Svetlá, a Czech writer, born at Prague, Feb. 24, 1836, and published her first story in the almanac *Máj*. Among her better known novels are *Láska k Básnikovi*, *Roman z Casu Novejsich* (*Poet Love*, *Novel of the Present Time*) (1860); *Vesnicky Roman* (*The Village Romance*) (1869); *Fratina* (1870); *Kriz a Potoka* (*The Cross near the Brook*) (1871). Many of her stories have been translated into other languages, and she is regarded as the leading representative of Czech literature of the present day.

MYCALE, a wooded promontory of ancient Iona, over against Samos. In the channel between them Leotychides the Spartan and Xanthippus the Athenian defeated the Persian fleet, 479 B.C.

MYCERINUS, MENKURA, or MENCHERES, a king and pyramid-builder. See Egypt, Vol. VII, pp. 635, 669, 670.

MYCODERM. See Fermentation, Vol. IX, p. 86.

MYCORHIZA, in botany a term applied to a remarkable case of symbiosis (q. v., in Supplements) which has been observed in certain plants, especially amentaceous trees and species of orchids and *Leguminosæ*. In these plants the absorbent region of the roots is covered by a felt-like growth of a fungus-mycelium, the structure being called *mycorhiza*. It is thought that this fungus aids in the absorption of organic material by the roots, though the exact nature of the service rendered has not been demonstrated. Also, see Ecology, in these Supplements.

MYER, Albert James, an American soldier and meteorologist; born in Newburg, N. Y., Sept. 20, 1827. He was graduated from Hobart College in 1847, and from the Buffalo Medical College in 1851. In 1854 he became a surgeon in the United States army. He was in command of the signal corps from 1858 to 1860 and in the latter year was appointed chief signal officer of the army. He served in the Civil War, ranking as brigadier-general. In 1870 he was appointed to take charge of the meteorological observations under the government. He was a delegate to the International Congress of Meteorologists at Vienna in 1873 and at Rome in 1879. He published *A Manual of Signals for the United States Army and Navy* (1868). He died in Buffalo, N. Y., Aug. 24, 1880.

W.M.C.

MYERS, Frederick William Henry, a British writer; born in Veswick, England, Feb. 6, 1843; studied at Cambridge, Trinity College; and was from 1865 to 1868 lecturer there. He wrote *The Renewal of Youth, and Other Poems* (1882); *Essays, Modern and Classical* (1883), and *Science and a Future Life, with Other Essays* (1893). He was for many years interested in the Society for Psychical Research, for which he jointly with others edited *Phantoms of the Living* (2 vols., 1886). Died at Rome, January 17, 1901.

MYLIOBATIDÆ, a family of fishes. See Ray, Vol. XX, p. 312.

MYLITTA. See Mithras, Vol. XVI, p. 554.

MYOPIA. See Ophthalmology, Vol. XVII, p. 807.

MYRMELEO. See Ant, Vol. II, p. 88.

MYRMIDONES. See Æacus, Vol. I, p. 162.

MYROBALAN, an East Indian fruit used in tanning. See Leather, Vol. XIV, p. 382.

MYRTACEÆ, a family of dicotyledonous plants, mostly with opposite leaves, which are entire, more or less leathery, evergreen and glandular-aromatic; regular four or five parted flowers, with numerous stamens; and fruit mostly a berry. It contains over two thousand species, confined almost entirely to the tropics, chiefly in America and Australia. Well-known genera are *Eugenia*, with species yielding cloves (flower-buds); *Eucalyptus*, well known on account of its rapid growth in swampy ground, which it helps to drain; Pimenta, yielding pimento and bay-rum; *Punica*, the pomegranate; *Bertholletia*, yielding the Brazil nut; *Psidium*, from which guava is obtained, etc.

MYTHO, a town of Cochin-China. See Saigon, Vol. XXI, p. 160.

MYTILENE. See Lesbos, Vol. XIV, p. 474, and Aqueduct of, see Aqueduct, Vol. II, p. 193.

MYTILACEÆ. See Mussel, Vol. XVII, p. 116.

MYXOMYCETES. See Fungus, Vol. IX, pp. 727, 734.

MYZOSTOMATA. See Parasitism, Vol. XVIII, pp. 263, 264.

N

NABUA—NANSEN

NABUA, a town of the Philippine Islands in the province of Ambos Camarines, Luzon, on main road, 21 m. S. E. of Nueva Caceres. Rice is an important product of the country. Pop. 17,789.

NABULUS. See SHECHEM, XXI, 819.

NACHTIGAL, GUSTAV, a German-African explorer; born at Eichstädt, Feb. 23, 1834. An army surgeon from 1858–61, he went, in 1861, to Algiers, and in 1863 to Tunis. In 1868 he was commissioned to convey presents from the King of Prussia to Sultan Omar of Bornu. Starting in 1869 from Tripoli, he traveled through Fezzan and Tibesti, reaching Kuka, the capital of Bornu, in 1870. After a visit to Kanem and Borku in 1871, he, in 1872, returned to Kuka, went then to Bagirmi, back to Kuka, and in 1873 to Wadai, returning in 1874 over Darfur to Cairo. In 1882 he was German consul at Tunis and placed, in 1884, Togo and Kamerun under German protectorate. Leaving there in 1885, he died, April 20, on board of the *Möve* and was buried at Cape Palmas, and later at Kamerun. He wrote *Sahara und Sudan* (2 vols., 1879–81). G.A.S.

NACOGDOCHES, a village and the capital of Nacogdoches County, eastern Texas, 135 miles N.N.E. of Houston and 160 miles N. of Galveston; on the Houston, East and West Texas railroad; has three churches, a court-house and three newspapers; cotton, lumber and hides are the staples of the district. Population 1900, 1,827.

NADIR SHAH OR KULI KHAN, a Persian monarch. See PERSIA, Vol. XVIII, pp. 651–654.

NAGYBÁNYA, a town in the eastern portion of Hungary, 32 miles E.N.E. of Szathmar Németri, near the Carpathian Mountains and the Transylvania frontier, on the Hungarian State railway. It is the center of a rich mine district, and is extensively engaged in the mining of gold and silver and in the manufacture of earthenware. Population, 8,732.

NAGY KAROLY, Austria-Hungary, a market town and railway junction, capital of Szatmar County, on a small affluent of the Theiss, 42 miles east by north of Debreczin. It is the center of a grain and stock-raising region, and is noted for its fairs. Population, 14,000. C.L.S.

NAHANT, a summer resort on a small rocky peninsula of Massachusetts Bay, 12 miles N.E. of Boston, separated by a narrow neck of land from the township of Lynn. Population, 1900, 1,152.

NAIHATI, a town of Bengal, India, 23 miles N.W. of Calcutta. Population, 29,700.

NAKOO OR GAVIAL. See CROCODILE, Vol. VI, pp. 524, 525.

NAMAQUAS, an aboriginal tribe. See HOTTENTOTS, Vol. XII, pp. 323, 326.

NAMAYCUSH, a large trout of the family *Salmonidæ*, known to naturalists as *Salvelinus namaycush*. It is also known as the Mackinaw trout. Specimens weighing from 15 to 50 pounds are common, and sometimes a weight of 100 pounds is reached. It is an excellent food-fish, and is found in almost all the large lakes of British America.

NAM DINH, French Indo-China, a town of Tongking on a deltaic branch of the Song Koi or Red River, 20 miles N.W. of Kim Son on the Gulf of Tongking, and 48 miles S.E. of Hanoi. It is fortified and was captured by the French in 1883. Population, 50,000. C.L.S.

NANAIMO, a town. See VANCOUVER ISLAND, Vol. XXIV, p. 64.

NANAK, a founder of Sikh sect. See PUNJAB, Vol. XX, p. 116.

NANDU OR AMERICAN OSTRICH. See RHEA, Vol. XX, p. 519.

NANSEN, FRITHJOF, a Norwegian Arctic explorer; born in Christiania, Norway, Oct. 10, 1861. He became curator of the zoölogical department of the Bergen Museum in 1882, and made a number of collecting expeditions for the museum. Dr. Nansen is best known by his explorations in the polar regions. His first voyage was made in 1882, when he explored the seas adjacent to Greenland and Iceland. In 1888–89 he made an unprecedented journey across Greenland's ice-cap from the east to the west coast. This exploit he described in *Across Greenland* (1890). In his explorations in the northern seas he became convinced that a constant current of water exists flowing northward from Bering Sea across the polar basin and along the east coast of Greenland, and that if a vessel could be placed in the path of this current it would be carried with the drift-ice near if not across the north pole. The one point upon which the failure of former explorers rested was the destruction of their vessels by the ice-pack. Nansen designed a vessel with rounded sides, which he thought would be lifted upon the ice and not crushed by it. In this vessel, the *Fram*, he started from Vardoe, Norway, July 21, 1893, intending to pass to the ice-drift by way of the New Siberian Islands and the Kara sea. Nothing was heard from him until Aug. 13, 1896, when his safe return to Vardoe was announced. He had been met accidentally on Franz-Josef Land by Jackson, an explorer, and

FRITHJOF NANSEN.

brought home by him. His vessel, the *Fram*, arrived at Norway a week later. The vessel had drifted with the ice-pack, but not across the pole. Dr. Nansen had left his vessel in March, 1895, when he took sledges to go directly to the pole, if possible. Lack of a sufficient number of dogs prevented his carrying out his plans. The farthest point north reached was in lat. 86° 14′, which is close upon three degrees farther than the highest point attained by the *Alert* in 1876. Has published *Esquimaux Life*, and *Farthest North.*

NANTICOKE, a borough of Luzerne County, eastern Pennsylvania, 20 miles S.W. of Scranton, on the Delaware, Lackawanna and Western and the Pennsylvania railroads, and on a branch of the Susquehanna River; productive anthracite coal-mines are in the vicinity. Population 1890, 10,044; 1900, 12,116.

NANTUCKET, a town, county and island, all co-extensive, of Massachusetts, 28 miles off the southeastern coast. It was settled at an early colonial date, was long a great center of fishing and shipping, and is now one of the choicest summer resorts of America. It contains a museum of relics of colonial days, and many ancient buildings. It has long been a favorite resort for artists, a distinctive type of American painting being called the "Nantucket school." It has few industries besides fishing and shipping. Its population in 1900 was 3,006. W.F.J.

NAPA, a city and the county seat of Napa County, California, in the west-central part of the state. It lies between the Coast Range Mountains and San Pablo Bay, about thirty-five miles north of San Francisco, and is reached by the Southern Pacific railroad. It is the seat of the state asylum for the insane, of a Methodist Episcopal college, and of other public institutions. It is the center of a rich fruit and vineyard country, and is famed for its production of wines. The population in 1900 was 4,036. W.F.J.

NAPANEE, a town and the capital of Lennox County, eastern Ontario, on the Grand Trunk railway and on the Napanee River, 26 miles W. of Kingston. It has a paper-mill and several smaller factories. Population, 1891, 3,433; 1901, 3,143.

NAPERVILLE, a city of Dupage County, Illinois, in the northeastern part of the state. It is on the Dupage River and the Chicago, Burlington and Quincy railroad, 26 miles west of Chicago. It is the seat of Northwestern College, and had in 1900 a population of 2,629. W.F.J.

NAPHTHALENE. See TAR, Vol. XXIII, p. 64.

NAPIER, MACVEY, a British encyclopædist; born in Glasgow, Scotland, April 11, 1776. His first literary work published in separate form was a treatise on the *Philosophical Works of Lord Bacon* (1817). He is known principally, however, for his work as editor of the *Supplement to the Encyclopædia Britannica*, published by Constable in 1815–24. He died in Edinburgh, Feb. 11, 1847. See ENCYCLOPÆDIA, Vol. VIII, pp. 182, 183, 184.

NAPIER, ROBERT CORNELIS, Lord Napier of Magdala, a British soldier; born in Ceylon, December 6, 1810. He was educated at the Military College, Addiscombe, and received his commission in the Bengal engineers in 1826. Becoming captain in 1841, he was largely instrumental in starting the Lawrence asylums for soldiers' orphans in 1845, and fought in the same year in the Sutlej campaign. In the second Sikh War (1848) he was chief engineer at the siege of Mooltan and at the battle of Goojerat and in 1852 was engaged on the frontier against the Hussunzye and Afreedee tribes, having been promoted to the rank of colonel. In the mutiny he acted as chief of the staff to Sir James Outram during the first relief of Lucknow, and constructed the elaborate engineering works which enabled the place to hold out until the second relief by Sir John Campbell, and aided the latter in the capture of the city. In 1860 he commanded a division under Sir Hope Grant, in the Chinese War. From 1861 to 1865 he was military member of the Indian Council, when he was appointed commander-in-chief of the Bombay army. In 1866 Queen Victoria created him Baron of Magdala. Six years later he returned to Europe and in 1883 was raised to the rank of field-marshal. He died in London, England, January 14, 1890. W.M.C.

LORD NAPIER.

NAPLES, a village of Ontario County, west central New York, 38 miles S.S.E of Rochester, at the head of Canandaigua Lake, on the Middlesex Valley railroad. It has grape-box factories, a knife factory, flour, planing and saw mills. Population 1900, 1,048.

NAPO, a river of Ecuador. See Vol. VII, p. 560.

NAPOLEON, a village and the capital of Henry County, northwest Ohio, 15 miles N.E. of Defiance and 30 miles S.W. of Toledo, on the Maumee River and the Wabash railroad. It is situated in a grain-growing section, and has woolen-mills. Pop. 1890, 2,764; 1900, 3,639.

NAPOLEON, VICTOR JEROME FREDERICK, a French pretender, head of the Bonaparte family of France, and claimant to the French throne; born July 18, 1862; son of Prince Napoleon and Princess Clotilde, daughter of Victor Emmanuel, King of Italy. As a royal pretender he was put forward by a party known as the Victoriens, led by Paul de Cassagnac, in opposition to his father, Prince Napoleon. The will of the Prince Imperial made Victor his successor, and the Victoriens acted upon the strength of that document. Victor did not oppose his father until 1884, when he became financially independent. Both father and son were obliged to leave France by the operation of the Expulsion Act of 1886. His father died in 1891, after which time Prince Victor was

the recognized head of the Bonapartist party in France.

NAPOLEONA, a tropical African genus of *Myrtaceæ* or myrtles, with showy crimson and orange flowers, and prized in cultivation.

NAQUET, Alfred Joseph, a French chemist and socialistic reformer; born in Carpentras, France, Oct. 6, 1834. From his graduation, in 1859, until 1867 he devoted himself to the study of chemistry, and in 1863, while professor of chemistry at Palermo, wrote *Modern Theories of the Principles of Chemistry*. For his part in a socialist congress at Geneva, in 1867, he was sentenced to 15 months' imprisonment, a fine of 500 francs and forfeiture for five years of all civil rights. For the publication in 1869 of a book called *Religion, Property, Family*, attacking religious marriage, he was condemned to pay a second fine of 500 francs, coupled with the loss of civil rights *in perpetum*. He was prominent in the events of 1870, and was nominated secretary of the Defense Committee by Gambetta. He was elected to the Chamber of Deputies in 1879, and by his radical ideas soon antagonized Gambetta. He secured the passage of a bill, in 1886, legalizing divorce. He was a supporter of Boulanger, and the author of *Divorce* (1877); and *Communistic and Liberal Socialism* (1890); and, in a scientific line, *Application of Analytical Chemistry to Toxicology* (1859).

NARCISSUS, in Greek mythology. See Echo, Vol. VII, p. 555.

NARES, Sir George Strong, a British naval officer and Arctic explorer; born in Danestown, Scotland, in 1831. He was educated at the Royal Naval College, New Cross, entered the navy, and was on board the *Resolute* in the Arctic expedition in 1852. On his return he joined the *Glatton*, and served in the last days of the Crimean War. For some years after he served on board the training ship *Boscawen*. In 1866 and 1867 he was on survey duty off the coast of Australia. From 1872 to 1874 he was in command of the *Challenger* on the famous voyage round the world. In 1875 he left England in an endeavor to reach the North Pole in the *Alert*, the companion ship, the *Discovery*, being commanded by Captain Stephenson. The ship wintered in lat. 82° 27′ and a sledging party reached lat. 83.10 degrees which was far in advance of any previous records. The explorers defined the character of the great polar ocean and supplied most important observations relating to the science of hydrography. He published as a result of his expedition *Official Report of the Arctic Expedition* (1876), and *Narrative of a Voyage to the Polar Sea During 1875–6* (1878). On his return, in 1876, he was knighted. During 1878 and 1879 he commanded the *Alert* in a survey of the Pacific Ocean. He was created vice-admiral in 1892. He wrote *Seamanship* (1862) and other works. W.M.C.

NARES, Robert, a British author; born at York, June 8, 1753. He was educated for the Episcopal ministry and was rector of several churches in London and in the provinces, and became archdeacon of Stafford. For several years he was assistant librarian of the British National Museum, and from 1792 to 1798 was editor-in-chief of the *British Weekly Critic*. He died in London, March 22, 1829. W.M.C.

NAREW, a river of Russia. It rises in the government of Grodno and flows W.S.W. to the main stream of the Bug, which it joins at Sierock, its waters being about as great in volume as those of the Bug. It is navigable to Tykoczin, 150 miles from its mouth.

NARRAGANSETT BAY, a large and irregular shaped body of water, occupying much of the southeastern part of the state of Rhode Island and opening into the Atlantic Ocean. The upper part of it is the estuary of the Providence River. Patience, Prudence, Hope and Conanicut islands are the largest of the many which stud the bay. At the eastern side is Aquidneck or Rhode Island, bearing the city of Newport (q.v.). W.F.J.

NARRAGANSETTS, a tribe of N. A. Indians of the great Algonquin family, formerly inhabiting Rhode Island, and commemorated by the bay which bears their name. During the early colonial settlement of New England, their attitude towards the whites was friendly, insomuch that Roger Williams was welcomed among them, and they were induced to waive all aboriginal rights to their territory in favor of the British crown. About the middle of the 17th century an expedition was sent against them, and in a series of battles, they were well-nigh exterminated. The remnants, about 150, remained on a reservation at Charlestown, Washington County, R. I., their tribal relations having been abolished in 1880. Are mostly half-breeds.

NARVACAN, a town in South Ilocos, Luzon, Philippine Islands, 13 m. S. E. of Vigan. It lies in a level valley surrounded by mountains. Soil fertile. Pop. 16,500.

NASBY, Petroleum V., the pseudonym of Locke, David Ross; q.v., in these Supplements.

NASCENT STATE, a term applied to the condition of elements at the moment of liberation from combination. Many are then more active than later, as they are probably still in the atomic state and have not yet combined to form molecules. Nascent hydrogen, formed from a metal and an acid (iron and acetic acid or zinc and hydrochloric acid), is often used as a reducing agent, as in the manufacture of aniline from nitrobenzene.

NASEBY, Battle of. See Fairfax, Vol. VIII, p. 746.

NASH, John, an English architect; born in London in 1752. He is chiefly celebrated in connection with the great street-improvements in London, but the architecture of mansion-houses and the designing of interiors were his forte. He also possessed great skill in effective architectural grouping. He claimed the credit of the invention of the use of metal girders in the construction of bridges. Regent Street, Haymarket Theater, and the terraces in Regent's Park are specimens of his designs. The pavilion at Brighton, about which he published a book, was another of his

works. He died in East Cowes Castle, May 13, 1835.

NASHUA, a village of Chickasaw County, northeastern Iowa, 36 miles N.W. of Independence, on the Illinois Central railroad. It has an academy, a high-school, a foundry and two flour-mills. Population 1890, 1,240; 1900, 1,268.

NASHUA, New Hampshire, a manufacturing city on six lines of the Boston and Maine railroad, 40 miles N.W. of Boston, Mass. Population, 1890, 19,311; 1900, 23,398. See NASHUA, Vol. XVII, p. 242. C.L.S.

NASHVILLE, a city and the capital of Washington County, south central Illinois, 48 miles S.E. of St. Louis, Missouri, and 100 miles S. of Springfield, on the Louisville and Nashville railroad. It has a court-house, a foundry, a flour-mill and a plow factory. Population 1900, 2,184.

NASHVILLE, a city and the capital of Tennessee. It has extensive lumber industries; the number of establishments reporting in 1900 was 488, representing an investment of $13,150,137; total wages paid, $3,764,946 to 9,435 people; value of products, $18,367,323. At the centennial celebration of the admission of Tennessee to the Union, held June 1, 1896, it was decided to hold a Centennial Exposition in Nashville, and May 1, 1897, was the date fixed upon for the opening. Immediate steps toward securing the necessary funds were taken, legislative action made certain, congressional legislation secured providing for free admission of foreign articles for exhibition, and announcements sent to the various state and foreign governments. Nashville had, in 1901, libraries which aggregated 100,000 volumes. Population 1890, 76,168; 1900, 80,865. See NASHVILLE, Vol. XVII, pp. 242, 243.

NASHVILLE, UNIVERSITY OF, a co-educational institution located at Nashville, Tennessee. It was organized in 1785 as Davidson Academy, on a charter from North Carolina. The academy was changed in 1806 to Cumberland College, which in turn, in 1826, became the University of Nashville. Military training has since 1855 been a part of the collegiate curriculum. In addition to the collegiate department, there is a medical school, organized in 1850. In 1901 there were 1,370 students in attendance, with 67 instructors; and the library had about 15,000 volumes. Including 1901, 4,000 students had graduated since the organization of the university. By an arrangement with the Peabody board, 184 scholarships, with a valuation of $100 per annum each, are maintained. In 1898 the institution had an income of $68,997, and productive funds amounting to about $300,000.

NASMYTH, JAMES, a British engineer, born in Edinburgh, Scotland, Aug. 19, 1808. Having studied for a few years in the public schools of his native city, he entered the High School of Arts, and finally the University. In 1828 he went to London; in 1829 found employment with Maudslay, and in 1832 opened a small engineering establishment in Manchester. Two years later he established at Patricroft, four miles from Manchester, what came to be known as the Bridgewater foundry, by which he amassed a considerable fortune, retiring from business in 1856. In 1839 he conceived the invention of the steam-hammer, patented in 1842, and in the interim employed in France. A steam pile-driver was also included among his important inventions. After his withdrawal from commercial life he devoted himself to the study of astronomy, adopted from his own devices various improvements in the telescope, and published various treatises, among them *The Moon* (1874), conjointly with Dr. Carpenter of Greenwich, and *Remarks on Tools and Machinery*, contributed to T. Baker's *Elements of Mechanism*. His autobiography was edited by Rev. Samuel Smiler. He died May 7, 1890.

NASR ED-DÎN, Shah of Persia; born April 4, 1829; was called to the throne Sept. 10, 1848. At the beginning of the war between Russia and Turkey, in 1853, he declared his neutrality, but shortly before its close entered into a treaty with Russia. He occupied Herat in 1853, but was compelled to withdraw by the British troops. In 1866 a treaty for establishing telegraphic communication between Europe and India through Persia was signed at Teheran. He traveled in Europe in 1873, visiting every nation of that continent. This visit was a strong argument in favor of the moderation and popularity of his rule, for although he was absent from his kingdom from May 12th till September 6th, not one breath of sedition disturbed the political calm that reigned there. He paid a second visit to Europe in 1889, and made a special journey to Russia in 1878. The diary kept by him during his first European trip was published in English in 1879. He was assassinated May 1, 1896. See also PERSIA, Vol. XVIII, pp. 663, 665.

NASR-ED-DÎN.

NAST, THOMAS, an American artist, born in Landau, Bavaria, Sept. 27, 1840. He came to the United States with his parents in 1846, and was educated in the public schools. He obtained employment on *Frank Leslie's Illustrated Newspaper*, and soon began to furnish drawings therefor. He was a travelling artist for British and American newspapers with Garibaldi in Italy in 1860–61, and later was engaged as political cartoonist on *Harper's Weekly*. In this position he was largely instrumental in securing

THOMAS NAST.

the downfall of the Tweed ring in New York city. He illustrated several books, and was well known as a lecturer, making a specialty of illustrating his addresses by rapid sketch-work on the blackboard, or by oil paintings executed in the presence of the audience. He died in Guayaquil, Ecu., Dec. 7, 1902. E.E.T.

NATAL. The colony of Natal, South Africa, formerly a part of the Cape of Good Hope, was in 1856 erected into a separate British possession. (See under AFRICA, page 78 of these Supplements.) In it are now included Zululand and British Amatongaland, which previous to Dec. 1897 were administered as dependent protectorates. The bulk of the population consists of Kaffirs, only about 65,000 being of European birth. The chief products of the colony are wool cereals, gold, and coal. Sugar is also raised, and tea-planting has been recently introduced. Of live stock, consisting of horned cattle, sheep, goats, and horses, there are increasing numbers raised by both natives and Europeans. Area 29,200 sq. miles; pop. (1900), 929,970. The capital is Pietermaritzburg. Pop. (1900), 28,500; pop. of seaport, Durban, 48,410.

At the outbreak of the Boer war of 1899–1900, northern Natal was largely invaded by the Dutch burghers of the Transvaal and the Orange Free State, under the late General Piet Joubert and Commandants Kock, Myer, and Viljoen. The Boer levies entered the colony by way of Laing's Nek and through Van Reenen's, Botha's, and the Tintwa passes in the Drakensberg mountains, occupying Charlestown and Newcastle, and threatening a British force at Dundee. The latter was commanded by General Sir W. Penn Symons, who having fallen in directing the attack on Talana Hill, was superseded by General Yule. At the British base, at Ladysmith, was General Sir George White, with some 9,000 men, including Natal volunteers and a number of troops from India. To enable Yule to retire upon Ladysmith, General White threw forward part of his force under General French, who met and beat back the enemy at Elandslaagte, capturing the wounded Boer Commandant Pretorius, and doing great execution among the routed burghers by the spears of the Fifth Lancers and the Imperial Light Horse. During the later stages of the action General White was present, and on the following day he had a brush himself with the Boers at Rietfontein, on the Modder Spruit. Meantime the railroad had been cut between Colenso and Ladysmith, and the heights dominating the latter were being taken possession of by the Boers. There had also been considerable fighting at Colenso, and at Farquhar's Farm and Pepworth Hill. Here the British lost heavily in killed and wounded, and in the melée Colonel Carleton's column, composed of about 900 men of the Gloucesters and Dublin Fusiliers, with four mountain guns, had the misfortune to be isolated and captured. At this juncture, General White decided to hold Ladysmith, and here the remainder of the troops rallied, about 9,000 strong, the Boers, some 20,000 in number completely investing the place. Just before the siege began (Oct. 30), there arrived at Ladysmith a naval brigade, 280 strong, from H. M. S. *Powerful*, under Captain Lambton, bringing with it two Maxims, four long naval 12-pounders, and two 45-pounders. With the brigade, whose arrival was most timely, there came a large supply of lyddite shells, charged with high explosives. Just before the investment began (Oct., 30), the British met with a serious loss. A complete column, composed of the Royal Irish Fusiliers, the Gloucestershire Regiment, and No. 10 Mountain Battery, making in all about 1,000 men, was isolated and surrounded by the enemy in the hills overlooking Ladysmith, and after losing heavily capitulated. Another column, which formed the left flank of the British force in a general attack on the Boers, lost both guns and reserve ammunition through the mules stampeding, and fought till its ammunition was exhausted. On Nov. 9 a persistent attack on Ladysmith was repulsed with heavy loss to the Boers. The siege was maintained until Feb. 28, 1900. On the evening of that day the city was entered by the Earl of Dundonald's cavalry division, the advanced guard of an army corps under General Sir Redvers Buller, who had come to Natal early in the previous November and who, after many misadventures and much gallant fighting, was instrumental in clearing the Boers out of the colony.

The task General Buller undertook in succoring Ladysmith and relieving Natal of the Boers was, as it turned out, a very serious one, entailing on the British repeated discomfitures and heavy loss of life. By the third week of November most of the transports had arrived at Durban with the new army corps, some 20,000 strong, exclusive of the force shut up under Sir George White in Ladysmith. When the latter was invested Sir C. Francis Clery, who commanded the remnant of the British and Natal troops (the 2nd Division) outside of Ladysmith, fell back on Estcourt and on the Mooi River, about which bands of Dutch burghers from the Free State were actively raiding. At Estcourt he was joined by General Hildyard, and both generals began pressing the Boers so hard that they retired to the Tugela River and began to intrench its high banks. Here General Buller found them in large force on his arrival from England to take in Natal the supreme command. From his camp at Chieveley, Buller, on Dec. 15, advanced to attack the strong Boer position at Colenso on the Tugela. By this time the Boers, however, had energetically mined and intrenched themselves along the river banks and had planted heavy guns on every eminence commanding the approach to their position. Boer sharpshooters, moreover, had concealed themselves in dug-outs along the river, ready to pick off the British officers leading the assault, and especially to shoot the artillery horses hauling the British guns into position. The burghers had also damned the river in several places so as to impose obstacles to an advancing enemy, while they had cunningly covered the ground with barbed-wire entanglements. On the approach of Buller's force the

strength of the Boer position was at once disclosed, and though the various attacking commands sought to do prodigies during the day the British had everywhere to fall back, with heavy loss, and in the end had to retrace their steps to Chieveley The chief incident of the engagement that led to the British discomfiture was the capture of twelve guns, Colonel Long, who commanded the artillery, having advanced unwarily so close to the river that the Boer sharpshooters killed the horses of the battery. It was in the attempt to rescue the guns that Lieut. Roberts, son of Lord Roberts, was killed and found a grave at Chieveley.

A period of inactivity followed the failure of this attack on the Boer positions until the British force, early in the year 1900, was further increased by the arrival of the 5th Division of the South African Field Force under General Warren, and until the coming of Lord Roberts to take the supreme command. With the arrival of the latter and the active invasion of the two Boer republics which followed, and which drew many of the Boers to defend their native states, General Buller's task lightened in clearing Natal of the enemy. For the details of these later operations, see the BOER WAR, in these Supplements. G. M. A.

NATALIE, QUEEN OF SERVIA, born May 14, 1859. Her father was Pierre Ivanovitch Keschko, a Russian officer. She married Prince Milan, afterward King of Servia, in 1875, but the marriage turned out unhappily, and the union was broken in 1888 when Milan obtained a divorce. She went to France, but in 1895 returned to Belgrade. After the assassination of King Alexander in 1903 the authorities at Belgrade decreed that she should not again enter Servia. W.M.C.

NATCHEZ, a city and the capital of Adams County, southwestern Mississippi, 86 miles S.W. of Jackson and 280 miles N.W. of New Orleans, on the Mississippi River and on the Illinois Central railroad. It has an extensive shipping-trade in cotton. Pop., 1890, 10,101; 1900, 12,210.

NATCHITOCHES, a town and the parish seat of Natchitoches Parish, Louisiana, in the northwestern part of the state. It lies on the Red River, 215 miles northwest of New Orleans, in one of the richest cotton, sugar and corn districts of the state, and is reached by the Natchitoches and Red River railroad, a branch from the Texas and Pacific. Its population in 1900 was 2,388. W.F.J.

NATIONAL ASSEMBLY. See FRANCE, Vol. IX, pp. 526, 529.

NATIONAL DEBT. See DEBT, UNITED STATES, in these Supplements.

NATIONAL LIBRARY, otherwise known as the Congressional Library; was established in 1800, but during the War of 1812 was destroyed, together with the capitol, in 1814. Many documents destroyed then it has been impossible to replace. Part of them, however, were duplicated in the library of Thomas Jefferson, which was purchased by Congress, and consisted of 7,000 volumes. The library had grown to 55,000 volumes in 1851, when by an accidental fire it was reduced to 20,000 volumes. The next year Congress appropriated $75,000 to replenish it. Since that time it has grown steadily, until, in 1899, it consisted of 957,000 volumes, including pamphlets. This included the law library, which is kept in a room near the Supreme Court. The library proper occupies the entire western pro-

LIBRARY OF CONGRESS, WASHINGTON, D. C.

jection of the capitol building. A new and separate structure, which will afford room for the natural expansion and give more opportunity for classification and arrangement, has been erected. This large growth has been due in part to the liberal Congressional appropriations, averaging in the last ten years $11,000 per annum, but more to the results of the Copyright Act and the consolidation with the library of the Smithsonian Institution. The largest private donation to the National Library has been that of Dr. Joseph M. Toner, of Washington, who in 1882 presented his private library of over 27,000 volumes. According to the regulations of the copyright laws a copy of each work copyrighted in the United States must be deposited in the National Library. This part of the law went into effect in 1870, when the Patent Office library was deposited in the National Library. The National Library is open to the public, who are privileged to use the books in the library, but not to take them away. Members of Congress alone are privileged to take the books away. The National Library is distinct from and should not be confused with the libraries of the Senate and House of Representatives. In 1899, the librarian of Congress, Mr. John Russell Young, died, and Mr. Herbert Putnam was appointed as his successor. See also ARCHITECTURE, in these Supplements.

NATIONAL MUSEUM, UNITED STATES, at Washington, District of Columbia, incorporated by Congress in 1842; was made a part of the Smithsonian Institution in 1858. The National Museum is controlled by the officers of the Smithsonian Institution, but is maintained by a special appropriation of Congress. The collections of all expeditions connected with the various government surveys and commissions are required by law to be deposited in the National Museum. The exhibits of the United States and many foreign exhibits at various expositions have been presented to the Museum. The collections of the Fish Commission, and of the Ethnological and other national bureaus have greatly enriched the institution. The collections soon grew too large for the original building, the Smithsonian, and a

new and separate structure, at a cost of $325,000, was erected and first occupied in 1881. Three reports are issued, known as the *Reports*, the *Proceedings* and the *Bulletins of the United States National Museum.* For methods of government, officers, etc., see SMITHSONIAN INSTITUTION, in these Supplements.

NATIONAL PARTY. See LABOR and PROHIBITION PARTIES, in thes Supplements.

NATIONAL REPUBLICAN PARTY. See WHIG PARTY, in these Supplements.

NATIONAL UNION. See BENEFIT SOCIETIES, in these Supplements.

NATIONAL UNION PARTY. See REPUBLICAN PARTY, in these Supplements.

NATROLITE. See MINERALOGY, Vol. XVI, p. 441.

NATRON. See MINERALOGY, Vol. XVI, p. 415.

NATRON LAKES, eight lakes in a depression to the W. of the Damietta branch of the Nile, about sixty miles W. N. W. of Cairo.

NATUNA ISLANDS, densely wooded and mountainous islands, N. W. of Borneo, Ranay, on Great Natuna, rising to a height of 3,500 feet. The largest of the islands has an area of 600 square miles. Population of the whole about 1,300.

NATURAL GAS, generally supposed to be the product of decomposition of vegetable and animal remains, marsh-gas being its principal element. It also contains carbonic acid, carbonic oxide, hydrogen, nitrogen, oxygen and ethylene. It is lacking, generally, in the necessary hydro-carbons which form the illuminating element of gas. Natural gas varies in its composition in different regions. In exceptional instances flows of natural gas have been found which possessed good illuminating powers, yet as a rule it is safe to state that as an illuminant natural gas is inefficient. From earliest historical times there have been recorded accounts of burning wells and springs. These springs existed in Asia and in some parts of Europe. In the settlement of America, wells and fissures from which gas escaped were discovered from time to time. The gas was first utilized in 1821 at Fredonia, New York, when its escape from a spring was conducted into the village and used for illuminating private houses. The first extensive discoveries of gas were in connection with drillings for petroleum in the Ohio valley in 1866. Previous to that time the salt-refiners of New York and Pennsylvania had encountered the gas while drilling to the salt-beds. Natural gas free from petroleum was found in the Ohio valley, especially in the region adjacent to Pittsburg. In 1884 the commercial value of natural gas began to be appreciated and wells were drilled in large numbers, the work being carried on in almost every state in the Union, although gas has been found principally in the central section of the Mississippi valley. Owing to the great pressure of the gas when issuing from the well, it has been found practicable to conduct it to manufacturing and commercial centers sometimes several hundred miles distant. Natural gas has great heating-power, and is used in Pittsburg in the blast furnaces and glass factories, and in Chicago and other cities for heating private dwellings. It has been found that the pressure from a well gradually lessens, until in some cases the flow ceases altogether. From this fact it is supposed that the supply will become exhausted within a comparatively short time. See UNITED STATES, Vol. XXIII, p. 870; and for a description of the gas-furnace, see FURNACES, in these Supplements.

NATURALIZATION, the process by which an alien transfers his allegiance from his native country to the country of his adoption. The laws of naturalization in Great Britain are dealt with exhaustively under the title ALIEN, q. v., Vol. I, pp. 506, 507. See also ALIEN, in these Supplements.

Naturalization is regulated by each individual nation in accordance with rules and regulations stipulated by treaty with those countries from which the aliens may come. The United States long since maintained the right of an individual, of whatsoever nationality, to renounce allegiance to his native country and assume the duties of citizenship in another state. This privilege, ardently defended by the United States and denied by Great Britain, brought about the War of 1812. Acting upon this theory, the United States have further maintained the right of a naturalized citizen to claim protection, in accordance with which treaties have been made with all the European powers.

NATURE-STUDY. "What is the use of Nature-study?" There are several good answers to this question. The first bears on the value of the study, as training. No one swings dumb-bells for the sake of doing it, but because he can thereby develop muscles that will serve him in his after-life. So Nature-study viewed wholly as training, must rank in the highest class. More than any other pursuit within the reach of all, it tends to develop powers of correct observation and clear reasoning from cause to effect. There are many studies which partly cover these same grounds. Thus, History affords ample opportunity for following a complex chain of events, but *not* from first-hand observation; Mathematics develops the powers of reasoning without observation; while Chemistry is almost purely experimental, that is, observational; and Medicine seems to belong to the same list. On the other hand, Surgery and Practical Engineering are as good as, or even better than, Nature-work for harmoniously developing the faculties of observation and reason; but these are beyond the reach of the many; and of all the available recognized studies in our schools and colleges to-day, none is a better developer of sight and insight, that is perception and causation, than Nature-study, which is a good, health-giving, outdoor pursuit.

Next, we may claim that Nature-study adds a new and elevating pleasure to life. According to a noted Roman sybarite—presumably an authority on his own life-study—a new pleasure was worth more than vast riches. In our own day, it will be remembered that the well-to-do of our race spend enormous sums each year, and rightly so, on pictures, music, the drama, and kindred pleasures, while here is one, at least worthy to rank with them, that may be brought within the reach of all; for it is impossible to put even a partially trained naturalist in a situation where he cannot delight himself with his pursuits. Chilon, the

Spartan, is credited with having said that Man's most important business is to "know himself." Many other sages have added the weight of their names to this dictum, logically believing that so far as this world is concerned, that man would come nearest to perfection who "knew himself," that is, understood his own powers and limitations, comprehended his place and relations in the universe. This final quintessence of all philosophy was made by a heathen, but the enlightened of our day have changed it only by drawing another circle outside to enclose it all, so that the dictum is still acceptable. No one can comprehend the nature and purpose of a wheel in some complex machine by study of that wheel alone. He must consider the whole machine, and especially the parts nearest to that particular wheel. Man, therefore, seeking to know himself, must fail utterly, unless he remembers that he is only a part of the great machine of the universe. He must study the other wheels, the life-forms about him, which are parts of his environment and offspring of the same creative power as himself.

These are reasons which may not appeal to those who pride themselves on being "thoroughly practical," therefore I shall give last, one which should commend itself to them, and which also has the greatest weight with those who view these things on the highest plane. It is always good to follow the truth for its own sake. It is always safe to do so; it is always wise. However doubtful the path may look at times, it always ends well. Follow the truth and you come to knowledge, and knowledge leads to wisdom. In the past generations there have always been a few scholarly "curious" gentlemen who found pleasure in studying the aspects of nature and in writing down their observations. Of this class were Gilbert White, Catesby, Bartram, Huber, and a thousand such observers. They did not know what they were working for, and their contemporaries considered them at best mere harmless idlers. But these men must have felt that they were right. They were blindly following the truth for its own sake. Unwittingly they went on piling up their little ascertained facts or fragments of facts, preparing building material, they knew not for what. But we to-day know that they were storing up bricks and timber for master-builders; they were clearing the way for Darwin and Pasteur and making them possible. The edifice to which they were blindly contributing was the splendid structure of Modern Science. And to realize how much that has done to help man toward happiness, we should have to ponder a long list of such modern subjects as:—Electro-therapeutics and Electro-diagnosis, with a large number of the applications of electric power; Medico-botany, with its superb modern pharmacopœia; Micro-zoology, Micro-botany, and Bacteriology, shedding sovereign light on most diseases; Phylogeny, Ontogeny, and Embryology, with their obvious practical bearing on the welfare of our race. Indeed the whole modern science of Sanitation, with all that it means for the reduction of human misery, is nothing but a practical application of the truths of Natural History. We must consider all these and realize that each of them was the immediate outcome or offspring of a better knowledge of the laws of life, that is "knowledge of himself," obtained by man through persistent Nature-study.

All this, it is granted, has been achieved by observation and study of the common things about us. For the future, what further reward is offered? We do not know. We have no way of guessing. But judging from past experience, we are sure of this: First, that he who simply tells the awkward truth of what he sees, is building better than he knows; while he who tries to make it fit some plan of his own is like an ignorant savage who tries to restore the effacements in a priceless ancient manuscript. Second, that whosoever, great or small, takes up this work, piling up little scraps of truth, no matter how minute, how seemingly trifling,—it may be only the shape of a mouse's claw, a queer quirk in a grass blade, an unusual hole in a leaf, or the track of a chippy sparrow in the mud,—but so long as he makes his record true, and puts it where it can be found when wanted, he is piling up building material for the next great architect.

What the building will be or when and whence the builder will come, no man can tell. But this we know—that when he does come, the edifice will be wonderful, tremendous, glorious. It will be a newer, better, far more competent shelter from misery for all mankind, than any we have yet achieved, and worth—yes, ten thousand times more than worth—all the labor that it cost. This is the ideal as well as the practical end. How much more so, since it is, as we know, an alluring pathway of pleasantness.

But however much we may need to set forth in order our reasons for Nature-study, this fact is sure: The world-mind darkly groping has long been trending that way. We are to-day on the crest of a great popular wave of interest in this pursuit. The feeling is no fad, no mere passing whim. Nature, close at hand, was the first study of mankind and after a period of neglect, our race is now returning to it. When Audubon published his *Birds of America*, such interests were the amusement of but a few scholarly gentlemen who were not taken very seriously by their friends. But to-day what a change! At least a majority of our young people are devoted to such pursuits, and in nearly all our schools there are special courses to foster the growing interest in Natural History. The vast number of popular books on Nature-study is probably more the effect than the cause of this, and the prominence given to Nature-work in standard curricula, is good evidence of the value attached to it by those best fitted to direct the mind of youth. There is no longer any question as to the desirability of a nature course; the educators differ only as to method. One party advocates a synoptic view of creation, another prefers to direct attention primarily to the familiar life-forms around us. A third, probably the wisest, believes in a method compounded of both. —Ernest Seton-Thompson.

NAUGATUCK, a town and organized borough, co-extensive, of New Haven County, Connecticut, in the southeastern part of the state. It lies on the Naugatuck River, 15 miles north by west from New Haven, and has hardware, woolen, rubber and other industries. It is reached by the New York, New Haven and Hartford railroad, and had in 1900 a population of 10,541. W.F.J.

NAUMANN, Johann Friedrich, a German ornithologist; born at Ziebigk, Feb. 14, 1780, where he also died April 13, 1857; professor and inspector of the ornithological museum at Anhalt-Köthen. He published *Naturgeschichte der Vögel Deutschlands* (12 vols., 1820–42); *Eier der Vögel Deutschlands und der Benachbarten Länder* (1819–28); *Taxidermie* (1815).

G.A.S.

NAUPLIUS. See Arthropoda, Vol. II, p. 567; and Crustacea, Vol. VI, pp. 570–579.

NAUTCH GIRLS or BAYADERE, the girls of India trained in the nautch, a combination of song and dance, much in vogue at all Hindu festive and other public occasions. The dance, made up of body and muscle movements in connection with the song, is supposed to portray some event or emotion. In some portions of India, bands of these girls are kept in the temples to aid in the rites.

NAUTICAL ALMANAC. See Almanac, Vol. I, p. 521; and Navigation, Vol. XVII, pp. 267–269.

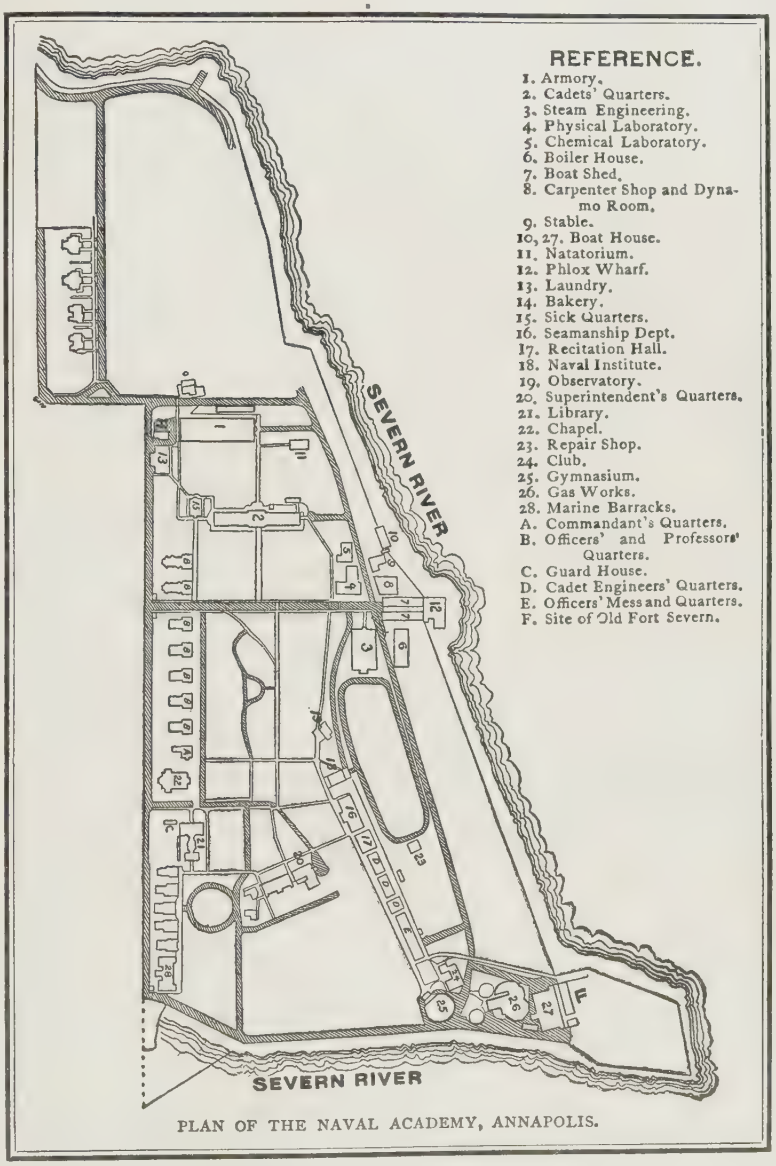
NAUTILIDÆ. See Mollusca, Vol. XVI, pp. 696–710; and Cuttle-fish, Vol. VI, pp. 648–653.

NAUVOO, a village of Hancock County, northwestern Illinois, 32 miles S. of Burlington, Iowa. The Mormons, who founded the place in 1840, erected here a large and costly limestone temple, which now, however, is but a ruin. It has a Catholic academy, two wagon-shops and two cigar factories. Population 1900, 1,321.

NAVAJOS INDIANS, a tribe of North American Indians, members of the Athabascan family. They were first known as a distinct tribe in 1630, when they were visited by the Spanish. At that time, and until the beginning of the nineteenth century, they occupied a large part of Arizona and New Mexico and the southern portion of Utah and Colorado. They were held in comparative check by the Utes on the north

and the Apaches on the south. Their present reservation embraces the adjoining corners of Arizona, New Mexico, Utah and Colorado. They numbered in 1895 about 20,500.

NAVAL ACADEMY OF THE UNITED STATES, The, a government training-school for cadets of the American navy, in relation to which it occupies the same position as West Point (q.v., in these Supplements) does to the army. The Naval Academy is located at Annapolis, Maryland, and occupies the site of old Fort Severn and some adjoining ground. As will be noticed by a reference to the accompanying ground-plan of the Naval Academy, no more suitable location for naval cadets could have been selected. The Severn River affords excellent facilities for practical instruction in boat-drill, as well as providing anchorage for the vessels in which the cadets are exercised and taken for sea-cruises. The academy was opened for the reception of cadets on Oct. 10, 1845, though the movement for its establishment dates back to a meeting of officers on the United States ship *Constitution*, when certain resolutions were adopted and transmitted to the Senate April 23, 1836. The site of the academy was selected at Annapolis, upon the land known as Windmill Point, the easternmost extremity of the town. Fort Severn played a prominent part in the second war with Great Britain, when the little town was blockaded by the English fleet, and nothing but the guns of Fort Severn, manned by resolute citizens, drove the enemy down the bay. Prior to the founding of the academy a partial and unsatisfactory system of instruction had been pursued by means of 25 teachers or schoolmasters, of whom 14 were afloat and the remainder distributed between Boston, Norfolk and Philadelphia. Later, these constituted a board of examiners of midshipmen, but the method of theoretical instruction was far below the proper standard. With the commencement of the academy the system was entirely changed. Commander Franklin Buchanan (q.v., in these Supplements) was the choice of Secretary Bancroft for the onerous duties of organizing America's naval college. This officer had already given much thought to the subject, and speedily formulated a comprehensive plan of the naval school. As such and under that title it was carried on until July, 1850, graduating many excellent officers. Commander Buchanan left the school for active service afloat in the Mexican War, and was succeeded by Commander G. P. Upshur. On July 1, 1850, Commander C. K. Stribling succeeded Commander Upshur as superintendent. A period of transition ensued from July, 1850, to November, 1851, wherein the institution, thenceforth styled the United States Naval Academy, was placed under the chief of the Bureau of Ordnance and Hydrography. The final organization of the academy took place in 1851, when many important changes were introduced. It is under the supervision of the Bureau of Navigation, Navy Department. The present (1902) superintendent is Commander Richard Wainwright, United States Navy.



PLAN OF THE NAVAL ACADEMY, ANNAPOLIS.

The full list of superintendents, with the dates of their assumption of command, is as follows:

Superintendents.	Assumed Command.
Commander Franklin Buchanan	Sept. 3, 1845.
Commander George P. Upshur	March, 15, 1847.
Commander Cornelius K. Stribling	July 1, 1850.
Commander Louis M. Goldsborough	Nov. 1, 1853.
Captain George S. Blake	Sebt. 15, 1857.
Rear-Admiral David D. Porter	Sept 9, 1865.
Commodore John L. Worden	Dec. 1, 1869.
Rear-Admiral C. R. P. Rodgers	Sept. 22, 1874.
Commodore Foxhall A. Parker	July 1, 1878.
Rear-Admiral George B. Balch	Aug. 2, 1879.
Rear-Admiral C. R. P. Rodgers	June 13, 1881.
Captain F. M. Ramsay	Nov. 14, 1881.
Commander W. T. Sampson	Sept. 9, 1886.
Captain R. L. Pythian	June 30, 1890.
Captain P. H. Cooper	Nov. 15, 1894.

When secession commenced, the situation at the Naval Academy became serious and alarming. Some of the Southern midshipmen sent in their resignations, disloyalty to the Union was prevalent in the vicinity, and the superintendent received warnings of a threatened attack. He drew up a plan of action and proposed to embark his officers and men on the frigate *Constitution*, then moored off Fort Severn, and take the vessel to Philadelphia, so as to prevent the capture of this historic vessel by the Confederate forces, but the Confederates hesitated, and Federal troops arrived. On April 27, 1861, the removal of the academy was ordered to Newport, Rhode Island, where at Fort Adams it remained until 1865,

CADET-MIDSHIPMEN'S QUARTERS, ANNAPOLIS, MD.

when a return to Annapolis was made. In 1865 a department of steam-engineering was established; in 1868 the chapel was built and the old chapel was converted into a hall for trophies and models. In 1869 the new quarters for the cadets were finished and the use of the *Constitution* as a school-ship was discontinued. The *Santee* was fitted up as a gunnery-ship, and in 1871 the old *Constitution* was removed from the academy.

During Admiral Porter's superintendency the executive mansion of the governor of Maryland, with the surrounding grounds, was bought by the government and inclosed within the academic walls. A new row of officers' quarters and a house for the board of visitors took the place of the executive mansion's wings, while the mansion itself became the library building of the academy. In 1862 the academy was placed under the supervision of the Bureau of Navigation, and on March 1, 1867, it came under the direct care and supervision of the Navy Department.

The grounds within the academic walls comprise some fifty acres, with 109 acres additional outside the walls. Picturesquely situated on the margin of the Severn River, the grounds are well timbered and are the acme of neatness. In front of the midshipmen's quarters stands the officers' monument, dedicated to the naval heroes who laid down their lives for their country in the war with Tripoli.

Cadets are appointed by members of the House of Representatives, each member being allowed one cadet graduate every six years. There are in addition 11 who are appointed by the President of the United States. After appointment the candidates are required to pass examinations, both physical and educational. In the beginning the course of instruction extended over five years, three of which were to be spent in sea-service. This has been so modified that the course is four years of academic study, supplemented by two years' practical instruction at sea. All cadets pursue the same curriculum for three years, but during the fourth year the engineer cadets devote their time almost exclusively to the study of engineering. Upon graduation the cadets are commissioned as ensigns, second lieutenants of marines, or as assistant engineers, the nature of the appointment being dependent upon the branch of the service for which the cadet has been prepared. There were in 1896, 214 cadets in attendance, of whom 38 were in the graduating class, 12 of these being intended for the engineer and the remainder for the marine and line corps. The academic staff, or faculty, numbered 56 commissioned officers, 49 of the line, besides six of the engineer and one of the medical corps. See also Navy, Vol. XVII, pp. 309, 310.

NAVAL OBSERVATORY, an American governmental institution, was established in 1842 under the name of the "Depot for Naval Charts and Instruments." It is under the supervision of the Bureau of Navigation, and is located at Georgetown Heights, Washington, District of Columbia, and has a superintendent and a staff of twelve naval scientific officers and assistants. Its most important function is astronomical, the *Nautical Almanac* (q.v., in these Supplements), under separate charge, being compiled at the observatory. The new buildings have been equipped at an outlay exceeding, it is believed, that of any similar establishment in the world. A review of its past and present system of appointing its chief officers and the scope of the work is well summarized in the following extract from Secretary of the Navy Tracy's report to Congress December, 1891, his recommendations being indorsed by twenty directors of astronomical observatories in the United States: "The system in existence hitherto, by which the selection of the superintendent has been confined to line officers of the navy, subject, like other officers, to changes of duty at comparatively short intervals, prevents that continuity of administration which is essential in carrying on the work of a great national observatory. No programme of scientific investigation,

especially in the department of astronomy, can be carried out successfully by any institution if liable to frequent interruptions by a change of its administrative head. I therefore recommend the adoption of legislation which shall enable the President to appoint, at a sufficient salary, without restriction, from persons either within or outside of the naval service, the ablest and most accomplished astronomer who can be found for the position of superintendent. I would also recommend, in view of the era of progress and scientific development upon which the observatory is now entering, that an advisory council be organized, composed of the superintendent of the observatory and its senior professor and of three other persons of scientific attainments, whose duty it shall be to consider and report upon new instruments and their proper installation, to draw up, with such changes as may be necessary from time to time, the programme of scientific work, including observation, reduction and publication, and to make such inspections and reports as may be desirable in regard to the character of the work done by the observatory." See also OBSERVATORY, Vol. XVII, pp. 728–738.

NAVAL ORDER OF THE UNITED STATES. See COLONIAL SOCIETIES, in these Supplements.

NAVAL RESERVE OR NAVAL MILITIA, in the United States, is a part of the National Guard. The total strength of the Naval Reserve is 3,392, its members being distributed in such states as have a water-front, either sea or lake. The reserve is organized and regulated in a manner similar to the National Guard of each state, having regular drills and an annual rendezvous. It is meant to familiarize suitable citizens with naval affairs for the purpose of supplying the positions of officers in case naval service becomes necessary at any time for the protection of United States coasts. On March 2, 1891, at the suggestion of Secretary of the Navy Tracy, who pointed out the importance of the naval militia as a defensive arm of the service, Congress appropriated $25,000 for the purchase of arms for the Naval Militia or Reserve, to be expended under the direction of the Secretary of the Navy. There are thirteen states that have organized naval forces, and which share in the annual appropriations of the government. The government thus fully recognizes the value of the naval reserve. Besides these annual appropriations, the Navy Department has made other donations toward the efficiency of various naval stations. To the state of New Jersey the department transferred the United States ship *Portsmouth* and the United States monitor *Ajax*, with their guns, rigging and equipment, which represent a large amount of money. At the close of the World's Columbian Exposition, Congress passed an act, giving the boats and other equipments exhibited on board the model battle-ship to the state of Illinois (Chicago battalion) for the use of its naval militia. The boats included a 33-foot steam-launch, a 33-foot sailing-launch, a 28-foot cutter, a 26-foot cutter, a gig, a whale-boat, a dingy and a catamaran. They were all made at the Brooklyn navy-yard, and are the finest examples of boat-building in existence.

NAVARRETE, MARTINO FERNANDEZ DE, a Spanish naval officer and historian; born in Abalos, November 8, 1765. He joined the Spanish navy in 1780, was made lieutenant in 1783, and retired in 1789, devoting himself to historical research in the archives of the state and the monasteries, giving particular attention to geographical science and discovery. He found among others the manuscript journals of Columbus. He wrote *Collections of Voyages and Maritime Discoveries Made by the Spaniards since the Close of the Fifteenth Century*, and *Collection of Unpublished Documents for the History of Spain*. He died in Madrid, October 8, 1844. W.M.C.

NAVARRO, MARY ANTOINETTE (ANDERSON), an American actress; born in Sacramento, California, July 28, 1859. Her father died three years after her birth, fighting under the Confederate flag before Mobile, in the Gulf of Mexico. Miss Anderson was brought up at Louisville, Kentucky, where her stepfather practiced medicine, having given up his plantation after the war. She received her education at the Ursuline Convent in Louisville. When she was about thirteen she saw Booth in *Richard III*, and her imagination was instantly fired. She entreated to be allowed to adopt the stage as a profession, and after much opposition her parents consented, and gave her lessons from the best instructors. At sixteen she made her *début* at Louisville in *Romeo and Juliet*. For some years she appeared in the United States and Canada in various parts, and she has had great success in London in the parts of *Parthenia*, *Pauline*, *Galatea*, *Juliet*, *Hermione* and *Perdita*, at the Lyceum Theater in 1884, 1885 and 1887. Though she relied chiefly on stock pieces, her creation of the character of *Clarice* in W. S. Gilbert's *Comedy and Tragedy* showed distinct originality. On June 18, 1900, she married Antonio F. de Navarro, a wealthy Mexican and retired to private life at Hampstead, England. She published *A Few Memories* in 1896. W.M.C.

MARY (ANDERSON) NAVARRO.

NAVASOTA, a town of Grimes County, Texas, in the eastern part of the state. It lies on the Navasota River, 130 miles northwest of Galveston. It is in an agricultural and cotton-raising region, and has some manufacturing industries and a large commerce, and is reached by the Houston and Texas Central and the Gulf, Colorado and Santa Fé railroads. Its population in 1900 was 3,857. W.F.J.

NAVASSA, an island in the West Indian group,

in lat. 18° 26′ N., long. 75° 3′ W. This island, under the provisions of title 72 of the Revised Statutes, has been recognized as appertaining to the United States. It contains guano deposits, is owned by the Navassa Phosphate Company, and occupied solely by its employees. In September, 1889, a revolt took place among these laborers, resulting in the killing of some of the agents of the company, caused, as the laborers claimed, by cruel treatment. These men were arrested and tried in the United States court at Baltimore, under section 5576 of the statute referred to, as if the offenses had been committed on board a merchant vessel of the United States on the high seas. There appeared, on the trial, such evidence of the bad treatment of the men, that, in consideration of this, and of the fact that the men had no access to any public officer or tribunal for protection or for the redress of their wrongs, President Harrison commuted the death sentences passed by the court against three of them, and the President, in his message of December, 1891, strongly recommended such legislation by Congress as should place labor contracts upon this and other islands having a similar relation to the United States under the supervision of a United States court commissioner for protection and for the redress of wrongs.

NAVE. See ARCHITECTURE, Vol. II, p. 411.

NAVESINK HIGHLANDS, also called but improperly NEVERSINK, a notable mass of hills in Monmouth County, New Jersey, just south of Sandy Hook. They are surmounted by the chief lighthouse at the entrance to New York harbor. The region is a favorite summer resort and the borough of Navesink Highlands had in 1900 a population of 1,228. W.F.J.

NAVEW, a garden vegetable much cultivated in France and other parts of the continent of Europe. The part used is the tapering root, which is rather like a carrot in shape. Its color is white. Its flavor is much stronger than that of the turnip.

*NAVY OF THE UNITED STATES. The past ten years have witnessed the transformation of our navy from a fleet of slow-steaming wooden vessels, with sail-power and antiquated batteries, into a fleet of sailless, rapid steel steamers, whose construction is in all respects not only equal to that of the vessels of any other nation, but is, in many cases, superior. Our first efforts were in the cruiser line, but of late we have gone into the construction of battleships, and the same success that attended the construction of the cruisers has followed in the new line. Our battle-ships *Indiana*, *Massachusetts* and *Oregon*, completed during the latter part of 1895 and early 1896, are model fighting-ships, while the *Kearsarge* and *Kentucky*, under construction, are believed to combine the qualities of attack and defense in a superior degree.

All homogeneous fleets are composed of battleships, armored and protected cruisers, scouts, torpedo-vessels and torpedo-boats, while monitors and rams are essential for harbor-defense, and gunboats for cruising and police duties in time of peace.

A battle-ship is practically a locomotive fort, and in its accepted form consists of a twin-screw steel hull minutely subdivided below the water-line by transverse and longitudinal bulkheads, with heavy steel armor along the water-line for about two thirds the length of the ship, forward and aft of which there is worked a heavy curved protective deck, which terminates forward in a powerful ram bow, and aft in the stern-post or the rudder-post. Below this deck are located the magazines, the boilers and engines, the steering-gear, the machinery for working the turrets, and all parts of the operating mechanism which might be disabled if placed above the water-line, and whose disablement would impair the fighting efficiency of the ship. The machinery occupies the central portion of this space below the protective deck, the engines side by side in a separate water-tight compartment, and separated from the boilers, which are also in separate compartments, by transverse coal-bunkers. Between the engines and the side of the ship are coal-bunkers, which, also, are fitted alongside the boilers, and generally in two subdivisions, in order to afford protection and to increase the stability of the ship in case of injury. In addition to these bunkers, there are others above the protective deck, so arranged that they feed into the lower ones, the capacity of all being generally between 1,000 and 2,000 tons. Beneath the engines and boilers an inner skin is worked, generally inclosing a space from four to five feet in depth, known as the double bottom, between it and the outer skin. This space is subdivided, so that if, through grounding or other cause, the ship's bottom were punctured, the damage would be localized, and there would be no danger of the loss of the ship. Forward and aft of the machinery space are magazines, storerooms for provisions, clothing and other necessary articles, torpedo-rooms, water-tanks, chain-lockers and spare gear. Above the armored belt at the water-line there is a stretch of thin armor extending to the battery deck, where the heaviest guns are mounted, usually in pairs, at the center line of the ship, and at a point about in line with ends of the armor belt; between these heavy guns are lighter ones, in an inclosed superstructure or casemate having armor protection. Still higher, and usually on each side of the ship, are mounted armor-piercing guns intermediate in caliber between the two sizes mentioned. On the same deck, and at the ends of the casemate, are placed the conning or fighting towers, which are generally six or seven feet in diameter, and heavily armored, and from which the movements of the ship are directed in action. In these towers are placed steering-wheels, communicating by wire rope with the steering-engines below the protective deck, telegraphs to and from the engine-rooms, with reply-connections to show that the signals have been understood, other telegraphs which show the direction of revolution of the main engines and the speed at which they are running, speaking-tubes and call-bells to all important stations in the ship, telephone connections, etc. There are usually one or two military masts, without yards or sails, save light yards for signal purposes, and fitted to them are tops, in which are mounted small rapid-fire and machine guns for the purpose of raking the deck of an adversary during action. On the

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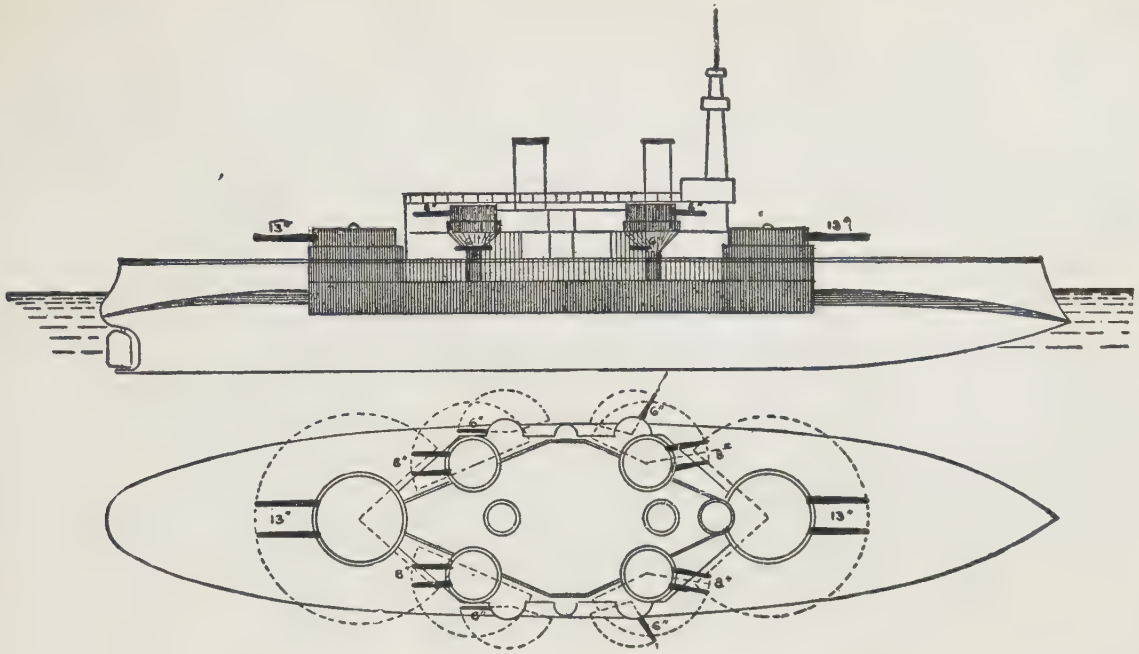
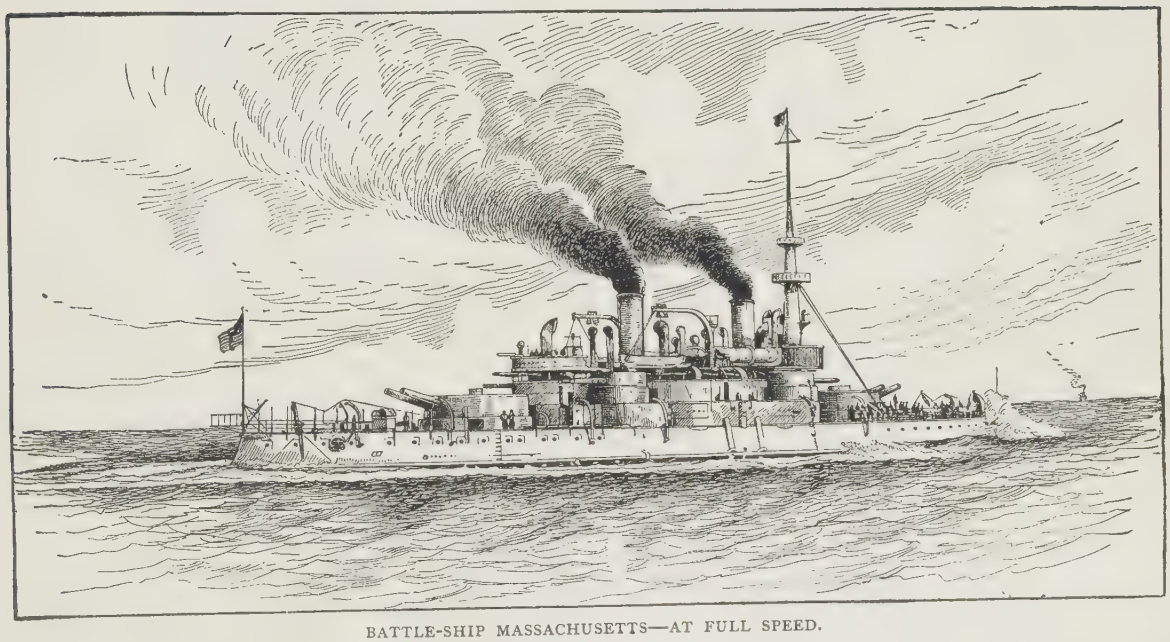
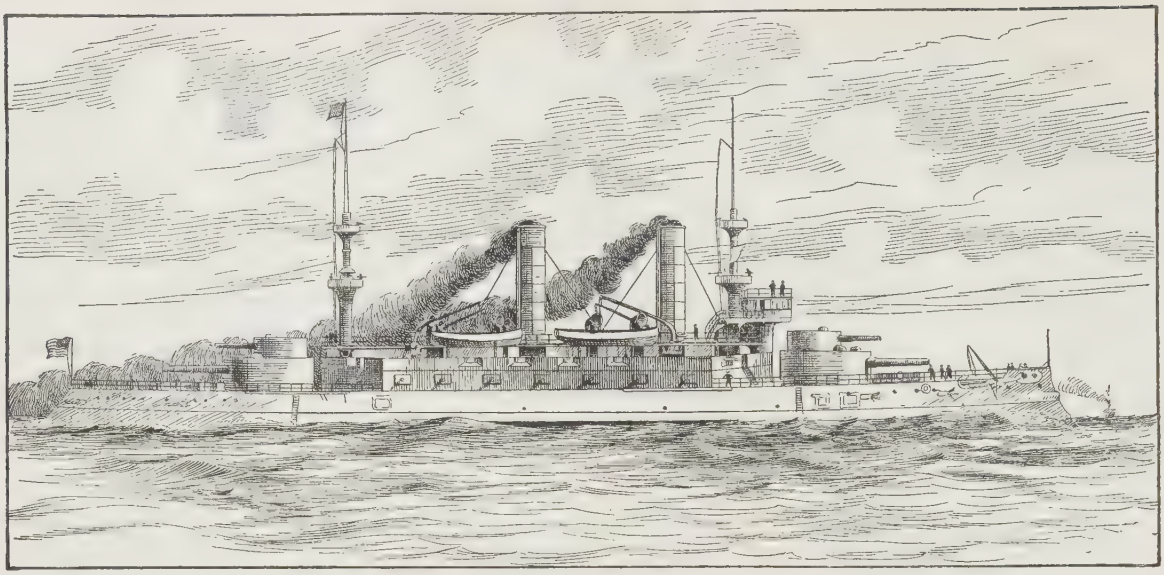


BATTLE-SHIP MASSACHUSETTS—SIDE ELEVATION AND DECK PLAN.

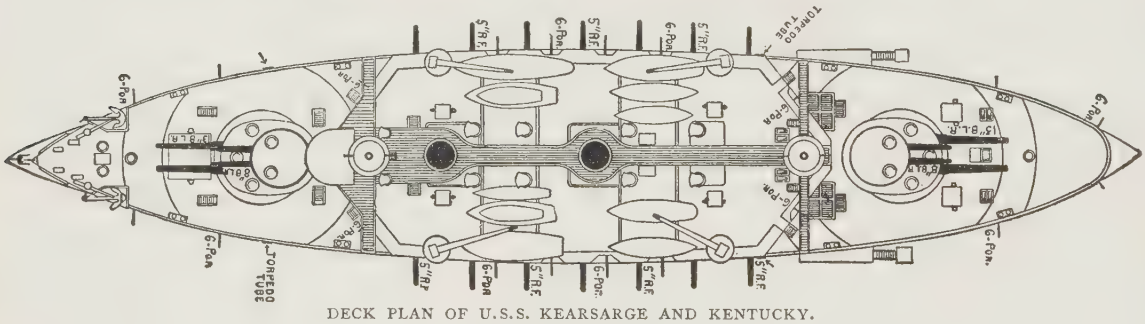


BATTLE-SHIP MASSACHUSETTS—AT FULL SPEED.

upper deck are mounted a number of small rapid-fire guns, and searchlights are disposed so as to command the approach to the ship from all directions. Besides the usual complement of small boats, a battle-ship usually carries one or two small torpedo-boats, which, in addition to the service of the ship, are utilized for firing torpedoes, though their true value in war would probably be very small, as their size is such that little could be expected of them. The ship is lighted by electricity and artificially ventilated, is heated by steam, has apparatus for distilling sea-water for drinking purposes and for making ice, has a workshop supplied with machine-tools capable of doing almost any work that would be required, engines for hoisting boats and operating the heavy guns, and is fitted generally with mechanical appliances for doing almost anything necessary to make the ship self-sustaining. One of the important lessons learned from the Japan-China war was, that the presence of so much woodwork as formerly found a place in our ships is a source of great danger during an engagement, from the fact that it is set afire so easily, and so all recent designs provide for little or no woodwork, its place being taken by light sheet-metal, or by some kind of incombustible wood.



A BATTLE-SHIP OF THE KEARSARGE TYPE.

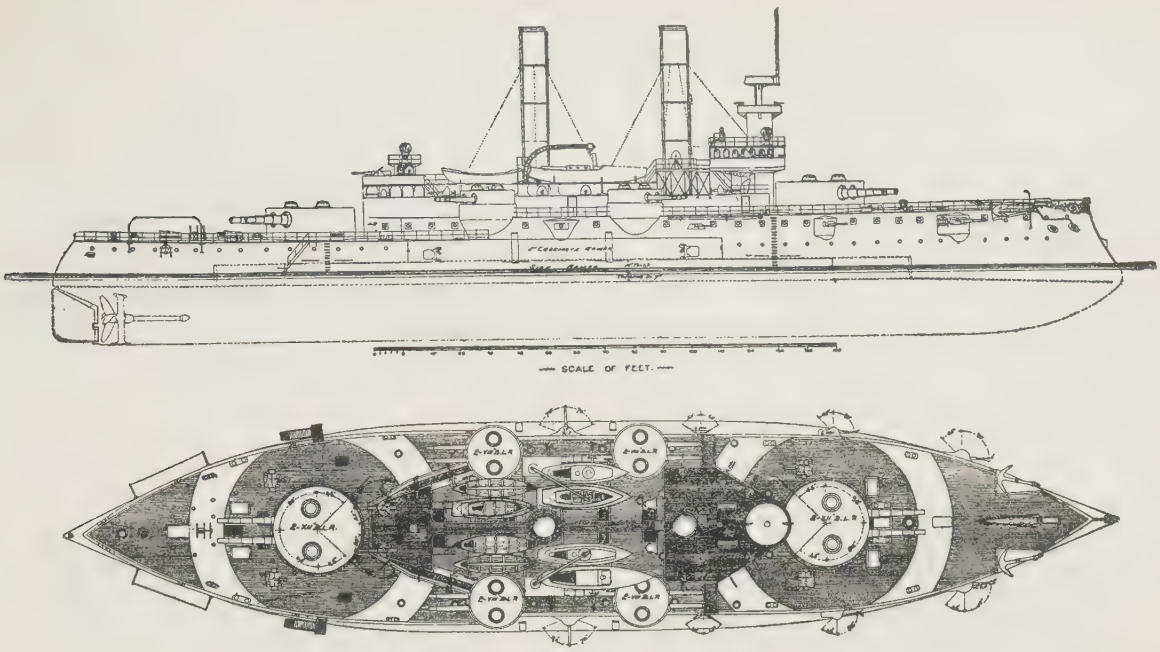


DECK PLAN OF U.S.S. KEARSARGE AND KENTUCKY.

Until 1894 the prevailing practice with most foreign countries in the construction of battle-ships was to fit a small amount of very heavy armor for a certain distance along the water-line, and leave the remainder of the side almost unprotected, save by thin armor. A change, however, has taken place, and the latest designs for British battle-ships provide for a much greater area of heavy armor, with a corresponding reduction in its thickness. The French have long insisted upon the importance of a complete water-line belt; but, as its weight entails certain sacrifices in other directions, other countries have not gone to the extent that the French have in this direction.

The *Kearsarge* may be taken as a typical battle-ship, and a description of her will serve for that of other battle-ships, and, with certain modifications, which will be stated, for that of other types of naval vessels. She is built entirely of steel, is 368 feet long on the water-line, 72.2 feet beam, 23.5 feet mean draft, and of 11,500 tons displacement. She has engines of 10,000 horse-power, and will steam at a speed of 16 knots an hour. In outward appearance she resembles the *Indiana*, except in the arrangement of the turrets for the 8-inch guns, and in that she has two military masts instead of one. In previous battle-ships the practice had been to mount the very heavy guns in turrets, a pair of each caliber in a separate turret, those of medium caliber in rear of, above and outboard of the heaviest ones; but in the *Kearsarge* and *Kentucky* the turrets are superposed or "two-story," the 8-inch ones being on top of the 13-inch, and revolving with them. This arrangement gives the greatest concentration of fire, and it is believed that there is not a battle-ship afloat that can withstand the fire from the guns as arranged in the *Kearsarge*. The main battery consists of four 13-inch, and four 8-inch rifles, and fourteen 5-inch rapid-fire guns; and the secondary battery of twenty 6-pounder, four 1-pounder, four Gatlings and one field gun. The 5-inch guns are placed in the citadel between the turrets, and the rapid-fire and machine guns on the deck above, in the military tops, and on the deck below the main deck.

The armor belt extends along the water-line from the bow to the after barbette, and is 3.5 feet above and 4 feet below the water-line; it is 15 inches thick at the top, and tapers to 9½ at the bottom, along the machinery spaces, forward of which it tapers to 4 inches at the bow, where it meets the ram. The protective deck, which extends from the ends of the armor belt to the bow and stern respectively, varies in thickness from 2¾ to 5 inches. Above the belt, to the height of the main deck, the armor is 5 inches thick, and that of the citadel containing the 5-inch guns, 6 inches. The armor on the 13-inch turrets is 17 and 15 inches, on the 8-inch turrets 11 and 9 inches, on the barbettes 15, and on the conning-towers 10 inches. All the armor is Harvey-



SHEER AND DECK PLAN OF U. S. S. IOWA.

ized nickel steel. Each 13-inch gun throws a projectile weighing 600 pounds, and each 8-inch gun one weighing 290 pounds. There are two military masts, with fighting tops, in which will be mounted rapid-fire guns. Five torpedo-tubes, one in the stem, and the others in broadside on the lower deck, complete the armament. The supply of torpedoes, which are of the automobile type, is eight. The engines are of the triple-expansion type, and have been designed to develop 10,000 horse-power at full speed; they have three cylinders each, and are placed in separate water-tight compartments, each operating its own screw. The boilers are designed to work at a pressure of 160 pounds per square inch, and to furnish all the steam that the engines can work off at that pressure; when working at full power the draft is forced by steam-fans, delivering air under pressure into an air-tight fire-room, in which each boiler is placed. When fully equipped and ready for sea, she carries 1,210 tons of coal, and draws 25 feet of water. The contract price for her construction, exclusive of the cost of her armor and guns, is $2,250,000, and when completed and ready for sea, she will have cost about $3,500,000.

A good idea of the distribution of weights in a modern battle-ship will be obtained from the following table, which is for the British battle-ship *Majestic:*

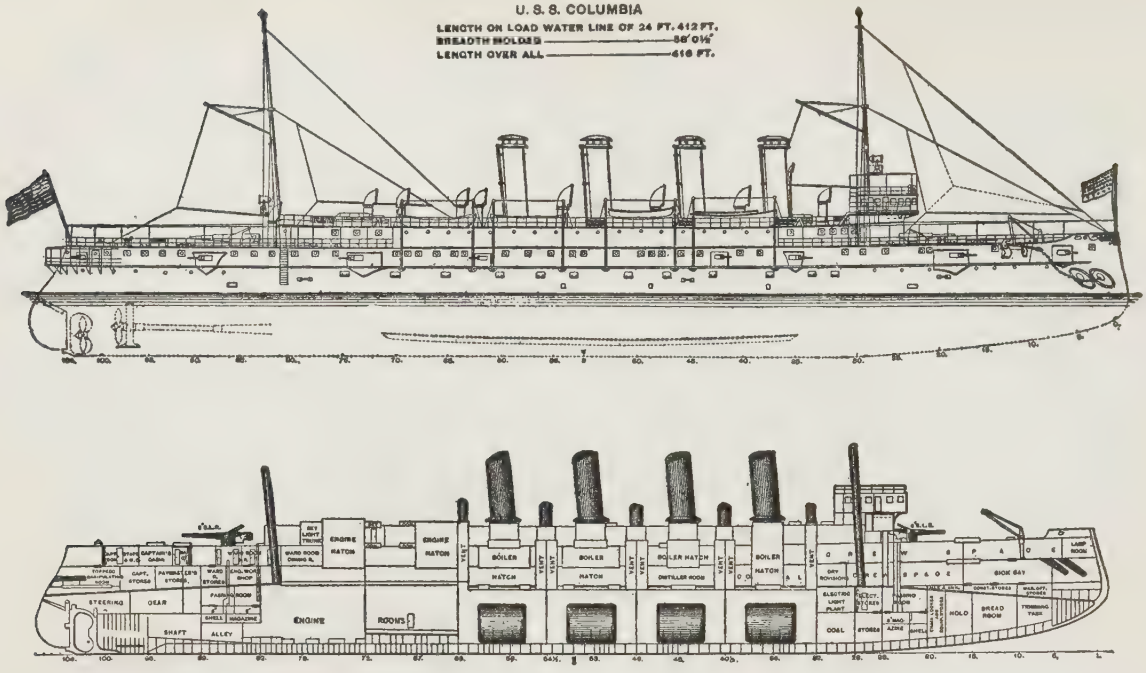
	Tons.
Steel in hull	4,340
Protective material	1,410
Armor	2,850
Backing	160
Wooden decks, etc	570
Fittings	850
Hull complete	10,180
Equipment	600
Armament	1,500
Machinery	1,300
Coal	900
Total	14,480

Besides the vessels of the *Indiana* and *Kearsarge* classes, which are, strictly speaking, the only vessels we have of the battle-ship type, we have two others, the *Maine* and the *Texas*, which are closely akin to them in general system of construction and armament, but are much smaller and not so heavily armed or protected. They are of 6,682 and 6,315 tons displacement, respectively, and 17 knots speed. The *Maine* carries four 10-inch and six 6-inch guns, and the *Texas* two 12-inch and six 6-inch guns. Each has side-armor 12 inches thick, but its extent is much less than in the battle-ships.

In addition to these, we possess six formidable vessels for harbor-defense, in the double-turret monitors *Amphitrite*, *Miantonomoh*, *Monadnock*, *Monterey*, *Puritan* and *Terror*. All except the *Puritan* are of about 4,000 tons displacement, and have a speed of from 12 to 14 knots. The *Puritan* is of 6,000 tons, and has a speed of 13 knots. All except the *Monterey* and *Puritan* carry four 10-inch guns, mounted in pairs, as in the battle-ships; the *Monterey* two 12-inch and two 10-inch, and the *Puritan* four 12-inch guns. The armor on the *Monterey* varies in thickness from 13 to 6 inches, on the *Puritan* from 14 to 6, and on the others from 9 to 7 inches; that on the turrets is from 7½ to 11½ inches thick.

These vessels, having been designed specially for harbor-defense, are not expected to do such cruising-work as is done by the other battle-ships, although they are capable of cruising in comparative comfort. On account of their low freeboard, they are intended to fight only in comparatively smooth water.

There are, besides the above, 13 other monitors, which were constructed during the Civil War, and which would be of comparatively little value in these days of high-powered guns. They are built of iron, have a speed of from 6 to 7 knots, and mount, each, two 15-inch smooth-bore, muzzle-load-



ing guns, in one turret. Their side-armor is only 5 inches thick, and that on the turret 10 to 11 inches. With modern guns, however, they might be of some service as harbor-defense vessels.

The next most important vessels in our navy are the cruisers, which are built primarily for speed, and which differ in construction from the battle-ships principally in having little or no vertical armor along the water-line, the protection to the vitals of the ship being afforded by a thick protective deck, and in having lighter protection for the guns than the battle-ships have. The vessels are smaller than the battle-ships, and also carry a lighter battery. In them, offensive and defensive qualities have been sacrificed for speed and for coal-carrying capacity, in order that they may be able to remain at sea a considerable length of time, and overtake a merchantman once he is sighted; that they may act as scouts for a fleet, and perform those duties, in peace, necessary for the protection of our commerce and the maintenance of our position amongst the great nations of the earth. Two of our cruisers, the *New York* and the *Brooklyn*, have a small amount of light side-armor, three inches thick in the former and four in the latter. The *New York* mounts six 8-inch and twelve 4-inch, and the *Brooklyn* eight 8-inch and twelve 5-inch guns. These vessels are regarded justly as the finest vessels of their class afloat, and the former, on her trial in 1892, maintained for four hours a speed of 21 knots an hour. Her engines are of 17,400 horse-power, and have been designed so that the ship may cruise economically at low speed. For this reason there are four engines of the same size in the ship, two on each shaft, and so arranged that the forward ones, which, like the after ones, are each in a separate water-tight compartment, may be disconnected when cruising at low speed. The operation of disconnecting or connecting takes only about 20 minutes, as compared with 36 hours on the English cruiser *Blake*, of similar construction. Two others of our cruisers which have been the subject of universal commendation, and of no little amazement, are the *Columbia* and the *Minneapolis*, of 7,375 tons displacement, which, on trial, made the unparalleled speed of 22.81 and 23.07 knots respectively. These vessels are intended as "commerce-destroyers," and in them much of the offensive power of previous cruisers has been sacrificed to speed and endurance, their battery comprising but one 8-inch, two 6-inch and eight 4-inch guns. To get such speed as these vessels attained, and at the same time to make them fairly economical cruisers in time of peace, the power was divided among three screws, one in the center and one on either side, as is usual in twin-screw steamers, each screw operated by an engine of equal power. While this system of propulsion had previously been tried on a few small vessels, the *Columbia* marked its first successful application to vessels of considerable power, and since her advent a number of similar designs have been projected abroad. Up to 1896 there was not a vessel of their size in any navy with a speed equal to theirs, and there was not in any navy a vessel of any size which had maintained such a speed over a measured course for so long a time as they did. In July, 1895, the *Columbia* made the run from the Needles to Sandy Hook, a distance of 3,090 miles, in 6 days, 23 hours and 49 minutes, thus maintaining an average speed of 18.41 knots for the distance,—a performance which no other man-of-war afloat, except the *Minneapolis*, could approach, and one which has never been equaled by any vessel of her size, naval or merchant. That she did not make greater speed is due entirely to the fact that she does not carry coal enough to enable her to cross the ocean at a much higher rate.

Next in importance comes the *Olympia*, a vessel

of 5,600 tons, which made a speed of 21.69 knots on her acceptance trial. Her battery is a very formidable one for a vessel of her size, comprising four 8-inch and ten 5-inch guns, and makes her a most valuable addition to our list of fast cruisers. Following her come the vessels of the *Baltimore* class, including the *Newark*, *Philadelphia* and *San Francisco*, whose displacements range from 4,100 to 4,500 tons, and speed from 19 to 20 knots. They mount a heavy battery, are well protected, and are much more economical to maintain than large cruisers of corresponding speed. At the same time they are quite up to the standard of cruisers of similar class in foreign navies. Coming down to the other cruisers, the most important one is the *Chicago*, whose original design was completed in 1883, since which time so many improvements have been made that her machinery is to be removed and entirely new machinery of modern design substituted, which will result in increasing her speed from 15 to about 19 knots, and, with the modifications in her battery which will be made at the same time, in making her a vessel equal in all respects to the vessels of her class. The *Charleston*, *Atlanta* and *Boston* come next, the two latter having been built at the same time as the *Chicago*, and the latter from plans purchased in England, and modified by the Navy Department. The cruisers following in order are vessels which, with the exception of the *Cincinnati* and *Raleigh*, would be of little use during war, except for scouting duties near the coast, but are very useful in time of peace. They have not a double bottom, and carry only light fore-and-aft sail.

Of late years foreign governments have built a number of torpedo-cruisers or gunboats, whose *rôle* is the destruction of torpedo-boats, torpedo-attack on a battle-ship, and scouting for a fleet. They range in size from 500 to 1,000 tons, and in speed from 18.5 to 21.5 knots, and carry a powerful armament of torpedoes, and a sufficient number of rapid-fire guns to protect themselves from an attack by torpedo-boats. We have no vessels of this character, the only one approaching them being the dynamite cruiser *Vesuvius*, which could be converted into a torpedo-gunboat at moderate cost.

Experience of foreign governments with torpedo-boats of about 120 feet length and smaller has demonstrated that they cannot be depended upon to render that assistance to a fleet which might be expected of such vessels; and so, during 1895 and 1896, a large number of similar boats, called "torpedo-destroyers," were built in Great Britain, whose length is 200 feet and upward, displacement from 200 to 300 tons, and speed from 27 to 30 knots. To get this phenomenal speed, it is necessary to use the lightest kind of construction, both in hull and machinery, to supply steam from water-tube boilers and to reduce the stores and outfit to a minimum. As completed, they are marvels of the skill of the naval architect and marine engineer; but they are little more than racing-machines, whose life depends upon the exercise of unceasing care and the greatest possible amount of attention. Their battery consists of one 12-pounder, five 6-pounders and two torpedo tubes or guns mounted on deck. Their *rôle* is the same as that of torpedo-boats, and, in addition, the destruction of the latter, which they are able to accomplish, on account of their greater size and speed and their more powerful battery. As yet we have no boats as large as these, but our latest designs of torpedo-boats are for vessels of considerable size and speed.

The development of our torpedo-boats is illustrated in the table, where they are given in order of their design.

There is another vessel in our navy whose *rôle* will be unique in time of war. That is the ram *Katahdin*, constructed on the general idea of Admiral Ammen of the navy. She carries no heavy guns at all,—only a few rapid-fire ones, intended to repel attacks of torpedo-boats,—and her sole weapon of offense is a ram. While all our ships are built with a ram bow, none of them have been designed with a view specially to ramming, as has the *Katahdin*. She is very strongly built, has exceptional maneuvering power, on account of her keel being somewhat like an ellipse in contour, and when under way is scarcely visible, except for her smoke-pipe and wheel-house. Her deck is curved "turtle-back," and is armored heavily, so that she can withstand considerable attack. Her speed is something over 16 knots, which is well above the speed of most foreign battle-ships when in seagoing condition.

Of the old wooden vessels of the navy with steam-power, only a few remain in service, and they will probably not be of use for more than three or four years longer.

Besides the vessels given in the table, the navy has 12 tugs, 9 wooden steamers which are unfit for any service, and 6 wooden sailing-vessels which are used for receiving-ships at navy-yards and by the naval militia of some of the states.

Yards. There are navy-yards at Portsmouth, New Hampshire; Boston, Massachusetts; Brooklyn, New York; League Island, Pennsylvania; Norfolk, Virginia; Mare Island, California; and Washington, District of Columbia; and naval stations at Newport, Rhode Island; New London, Connecticut; Port Royal, South Carolina; Key West and Pensacola, Florida; and at Puget Sound, Washington—each under the command of a line officer. The navy-yards have facilities for the repair of hulls and machinery of ships, and the naval stations only for minor repairs and for the care of stores. The Washington navy-yard is now principally an establishment for the manufacture of guns and gun-mountings.

The naval station at Newport includes the torpedo-station, which is under the Bureau of Ordnance, the training-station for apprentices, which is under the Bureau of Navigation, and the Naval War College, which is under the Secretary's office.

The naval proving-ground for the test of armor and guns is at Indian Head, Maryland, and is under the Bureau of Ordnance.

The Museum of Hygiene in Washington is under the Bureau of Medicine and Surgery.

The personnel of the active list of the navy, Jan. 1, 1896, included 6 rear-admirals, 10 commodores, 45 captains, 85 commanders, 74 lieutenant-

ARMORED SHIPS.

	Length.	Breadth.	Mean Draft.	Displacement.	Indicat'd Horse-power.	Speed.	Armor.			Main Battery.	Torpedo Tubes
							Side.	Turret.	Barbette.		
Battleships:	Feet.	Feet.	Feet.	Tons.		Knots.	Inches.	Inches.	Inches.		
Alabama				11,525	11,366	17				4 13″, 14 6″	
Illinois				11,525	10,000	17				4 13″, 14 6″	
Indiana	348	69.25	24	10,288	9,738	15.55	18	15–6	17–6	4 13″, 8 8″, 4 6″	6
Iowa	360	72.2	24	11,410	11,000	16.5	14	15–5	15–6	4 12″, 8 8″, 6 4″	5
Kearsarge	368	72.4	23.5	11,525	10,000	16	15–10	17–9	15–12	4 13″, 4 8″, 14 5″	5
Kentucky	368	72.4	23.5	11,525	10,000	16	15–10	17–9	15–12	4 13″, 4 8″, 14 5″	5
Maine	318	57	21.5	6,682	9,293	17	12	8	12–10	4 10″, 6 6″	4
Massachusetts	348	69.25	24	10,288	10,400	16.2	18	15–6	17–6	4 13″, 8 8″, 4 6″	6
Ohio				12,500	16,000	18				4 12″, 16 6″	
Oregon	348	69.25	24	10,288	11,111	16.79	18	15–6	17–6	4 13″, 8 8″, 4 6″	6
Texas	301.3	64.1	22.5	6,315	8,600	17	12	12	.....	2 12″, 6 6″	4
Wisconsin				11,525	10,000	17				4 13″, 14 6″	
Monitors:											
Amphitrite	259.5	55.8	14.5	3,990	1,600	12	9–5	7½	11½	4 10″, 2 4″	None.
Miantonomoh	259.5	55.8	14.5	3,990	1,600	12	7	11½	.....	4 10″	None.
Monadnock	259.5	55.8	14.5	3,990	3,000	13	9–5	7½	11½	4 10″, 2 4″	None.
Monterey	256	59	14.5	4,084	5,244	13.6	13–6	8–7½	13–11½	2 12″, 2 10″	None.
Puritan	289.5	60.1	18	6,060	3,700	12.4	14–6	8	14	4 12″, 6 4″	None.
Terror	259.5	55.8	14.5	3,990	1,600	12	7	11½	.....	4 10″	None.
Ram:											
Katahdin	250.8	43.4	15	2,155	5,068	16.1	6	....	.....	Ram.	None.

	Length.	Breadth.	Mean Draft.	Displacement.	Indicat'd Horse-power.	Speed.	Armor.			Main Battery.	Torpedo Tubes.
							Side.	Turret.	Barbette.		
Armored Cruisers:	Feet.	Feet.	Feet.	Tons.		Knots.	Inches.	Inches.	Inches.		
Brooklyn	400.5	64.7	24	9,271	18,770	21.91	3	5½	8–4	8 8″, 12 5″	5
New York	380.5	64.8	23.3	8,200	17,400	21	4	5½	10	6 8,″ 12 4″	3
Single Turret Monitors:											
Canonicus	225	43.7	13.5	2,100	340	6	5	10	...	2 15″	..
Catskill	200	46	11.5	1,875	340	6	5	11	...	2 15″	..
Jason	200	46	11.5	1,875	340	6	5	11	...	2 15″	..
Lehigh	200	46	11.5	1,875	340	6	5	11	...	2 15″	..
Mahopac	225	43.7	13.5	2,100	340	6	5	10	...	2 15″	..
Manhattan	225	43.7	13.5	2,100	340	6	5	10	...	2 15″	..
Montauk	200	46	11.5	1,875	340	6	5	11	...	2 15″	..
Nahant	200	46	11.5	1,875	340	6	5	11	...	2 15″	..
Nantucket	200	46	11.5	1,875	340	6	5	11	...	2 15″	..

commanders, 250 lieutenants, 75 lieutenants (junior grade), and 170 ensigns, or a total of 715 line officers; 15 medical directors, 15 medical inspectors, 50 surgeons, 56 passed assistant surgeons and 22 assistant surgeons, or a total of 158 medical officers; 13 pay-directors, 13 pay-inspectors, 40 paymasters, 20 passed assistant paymasters and 10 assistant paymasters, or a total of 96 pay officers; 70 chief engineers, 66 passed assistant engineers and 37 assistant engineers, or 173 engineer officers; 24 chaplains—making a total of officers of the seagoing corps of 1,066. There are, besides, 12 professors of mathematics, 32 naval constructors and assistant constructors, 12 civil engineers, or, in all, 1,122 commissioned officers. There are 129 warrant-officers, comprising 34 boatswains, 38 gunners, 39 carpenters, and 18 sailmakers and 21 mates. There are thus 1,272 officers of all kinds on the active list. Promotion in all corps is by seniority, after passing a physical and a professional examination.

There is a retired list, composed of officers who have reached the age of 62 years, or who have been placed on it for physical disability resulting from causes incident to the naval service, or upon their own application after 40 years of service. Officers so retired receive 75 per cent of their sea-pay.

There are on the retired list 36 rear-admirals, 8 commodores, 9 captains, 15 commanders, 25 lieutenant-commanders, 43 lieutenants, 11 lieutenants (junior grade) and 11 ensigns, or 158 line officers; 16 medical directors, 7 medical inspectors, 13 surgeons, 8 passed assistant surgeons and 6 assistant surgeons, or 50 medical officers; 5 pay-directors, 4 pay-inspectors, 9 paymasters, 1 passed assistant paymaster and 2 assistant paymasters, or 21 pay-officers; 40 chief engineers, 35 passed assistant engineers and 29 assistant engineers, or 104 engineer officers; 4 chaplains—making 333 retired officers of the seagoing corps. Of the other officers on the retired list, there are 3 professors of mathematics, 4 naval constructors, 1 civil engineer, 17 boatswains, 28 gunners, 18 carpenters, 13 sailmakers and 3 mates, making a grand total of 420 retired officers.

The number of enlisted men allowed by law is 10,000, and of apprentices 750. The period of enlistment is three years for men, and during minority for apprentices, who are enlisted, with the consent of their parents or guardians, between the ages of 14

UNARMORED VESSELS.

	Length.	Breadth.	Mean Draft.	Displacement.	Indicated Horse-power.	Speed.	Guns.	Torpedo-Tubes.
Alert	175	32	12.75	1,020	500	11	2 9″	None.
Atlanta	271.3	42.1	16.83	3,000	4,000	15.6	6 6″, 2 8″	None.
Baltimore	327.5	48.6	19.5	4,413	10,064	20	4 8″, 6 6″	4
Bancroft	187.5	32	12.2	838	1,213	14.4	4 4″	2
Bennington	230	36	14	1,710	3,436	16.5	6 6″	6
Boston	271.3	42.1	16.83	3,000	4,030	15.6	2 8″, 6 6″	----
Castine	204	32.1	12	1,177	2,200	16	8 4″	1
Charleston	312.6	46.2	18.6	3,730	6,666	18.2	2 8″, 6 6″	4
Chicago	325	48.2	19	4,500	9,000	19	4 8″, 8 6″, 2 5″	----
Cincinnati	300	42	18	3,213	10,000	20	1 6″, 10 5″	4
Columbia	412	58.2	22.5	7,375	18,509	22.8	1 8″, 2 6″, 8 4″	4
Concord	230	36	14	1,710	3,405	16.5	6 6″	6
Detroit	257	37	14.6	2,089	5,227	18.7	9 5″	3
Dolphin	240	32	14.3	1,486	2,253	15.5	2 4″	----
Gunboat No. 10 (Annapolis)	168	36	12	1,000	800	12	6 4″	None.
Gunboat No. 11 (Vicksburg)	168	36	12	1,000	800	12	6 4″	None.
Gunboat No. 12 (Newport)	168	36	12	1,000	800	12	6 4″	None.
Gunboat No. 13 (Princeton)	168	36	12	1,000	800	12	6 4″	None.
Gunboat No. 14 (Wheeling)	174	34	12	1,000	800	12	6 4″	None.
Gunboat No. 15 (Marietta)	174	34	12	1,000	800	12	6 4″	None.
Helena	250.7	40.1	9	1,392	1,600	13	8 4″	1
Machias	204	32.1	12	1,177	2,046	15.5	8 4″	1
Marblehead	257	37	14.6	2,089	5,451	18.4	9 5″	3
Montgomery	257	37	14.6	2,089	5,580	19	9 5″	3
Michigan	163.3	27.1	9.0	685	300	10.5	4 30-pdr.	None.
Minneapolis	412	58.2	22.5	7,375	20,862	23.1	1 8″, 2 6″, 8 4″	4
Monocacy	255	35	9	1,370	750	11	4 8″	None.
Nashville	220	38.3	11	1,371	1,750	14	8 4″	1
Newark	310	49.2	18.8	4,098	8,869	19	12 6″	6
Olympia	340	53	20.7	5,586	17,313	21.7	4 8″, 10 5″	6
Petrel	176.3	31	11.6	892	1,095	11.8	4 6″	None.
Philadelphia	327.5	48.6	19.2	4,324	8,815	19.7	12 6″	4
Pinta	137	26	10	550	250	9	2 12-pdr.	None.
Raleigh	300	42	18	3,213	10,000	20	1 6″, 10 5″	4
Ranger	175	32	12.8	1,020	500	11	2 9″, 1 8″	None.
San Francisco	310	49.2	18.8	4,098	9,913	19.5	12 6″	4
Vesuvius	252.3	26.5	10.6	929	3,795	21.4	3 15″	None.
Wilmington	250.7	40.1	9	1,392	1,600	13	8 4″	None.
Yorktown	230	36	14	1,710	3,392	16.5	6 6″	6

TORPEDO-BOATS.

	Length.	Breadth.	Mean Draft.	Displacement.	Indicated Horse-power.	Speed.	Torpedo-Tubes.
Stiletto	88.5	11	3	31	359	18.2	----
Cushing	138.8	14.3	4.9	105	1,720	22.5	3
Ericsson	149.6	15.6	4.8	120	1,800	24	3
No. 3	160	16	5	142	2,000	24.5	3
No. 4	160	16	5	142	2,000	24.5	3
No. 5	160	16	5	142	2,000	24.5	3
No. 6	175	17	5.5	------	------	27.5	3
No. 7	175	17	5.5	------	------	27.5	3
No. 8	170	17	5.5	182	3,200	26	3
Submarine	85.3	11.5	------	168	1,200	8	2

WOODEN VESSELS.

	Length.	Breadth.	Mean Draft.	Displacement.	Indicated Horse-power.	Speed.	Guns.
Steamers:							
Adams	185	35	14.3	1,375	800	11	------
Alliance	185	35	14.3	1,375	800	11	6 4″
Enterprise	185	35	14.3	1,375	800	11	4 32-pdr.
Essex	185	35	14.3	1,375	800	11	6 4″
Hartford	225	44	18.2	2,790	2,000	12	13 5″
Lancaster	235.7	46	19.2	3,250	1,100	10	12 5″
Marion	216	37	16.5	1,900	1,000	11	------
Mohican	216	37	16.5	1,900	1,000	11	8 9″, 1 8″
Theis	166	30.3	18	1,250	535	9.3	------
Yantic	180	30	12.2	900	310	8.5	2 9″, 1 8″
Sailing-Vessels:							
Constellation	176	42	20	1,186	----	---	8 8″
Jamestown	163.5	36	16	1,150	----	---	------
Monongahela	223	38	16.5	2,100	----	---	4 8″
Portsmouth	153	38.3	16.5	1,125	----	---	2 8″, 1 60-pdr
Saratoga	147.5	36.1	16	1,025	----	---	------
St. Marys	150	37.5	15.5	1,025	----	---	------

and 17. After 20 years' continuous service enlisted men may, with the approval of the Department, be assigned to duty on receiving-ships at navy-yards, and in other duty not requiring long absence from home; after 30 years' service they may be admitted to the Naval Home.

Officers of the navy are detailed for duty in the Coast Survey, the Lighthouse Service and in the Fish Commission, although those services are under the Treasury Department.

The marine corps, which is under the Navy Department, comprises 76 officers on the active list and 2,100 enlisted men, all under the direction of a colonel commandant with headquarters at Washington. There are 22 officers on the retired list. The

period of enlistment in the marine corps is five years, and the pay and allowances the same as in the army. The duties of the corps are the general police of navy-yards and stations, and of ships in commission, as well as duty at the guns. G. W. MELVILLE.

NAVY OF THE UNITED STATES, ORGANIZATION AND ADMINISTRATION OF. See NAVY, in these Supplements.

NAVY DEPARTMENT, a state department presided over by a Secretary, who is a member of the Cabinet, appointed by the President and confirmed by the Senate for a term of four years, or at the pleasure of the President. The Secretary is assisted by an assistant secretary, similarly appointed and under the same rule as regards tenure of office. The technical work of the department is distributed among eight bureaus, as follows, the chief of each having the relative rank of commodore while holding the office.

Yards and Docks, presided over by a line officer. Duties: Construction and maintenance of docks, wharves, cranes, etc., buildings, except hospitals and magazines, and generally all civil-engineering work in the navy-yards.

Navigation, presided over by a line officer. Duties: Personnel of the navy, including the education of officers and men, enlistment of men and apprentices, movements of ships and fleets, and hydrographic work.

Equipment, presided over by a line officer. Duties: Manufacture of ropes, anchors and cables, rigging and cooking utensils, installation and repair of electric-lighting apparatus on board ship, purchase of coal, control of Naval Observatory and *Nautical Almanac* office.

Ordnance, presided over by a line officer. Duties: Manufacture and charge of guns, torpedoes and ammunition; charge of torpedo stations and magazines; design of turrets and distribution of armor and armament on board ship.

Construction and Repair, presided over by a naval constructor, with the title of chief constructor. Duties: Design, building and repair of hulls of ships and small boats, securing armor and turrets, ventilation of ships, etc.

Steam-Engineering, presided over by a chief engineer, with the title of engineer-in-chief. Duties: Design, building and repair of machinery for the propulsion of ships and for auxiliary purposes, turret machinery, etc.

Medicine and Surgery, presided over by a naval surgeon, with the title of surgeon-general. Duties: Design, erection and maintenance of hospitals, management of them and of laboratories and dispensaries; purchase of medicine.

Supplies and Accounts, presided over by a pay-officer, with the title of paymaster-general. Duties: Purchase and supply of all provisions and stores, except medicine, and the accounts relating thereto.

The chiefs of the bureaus of yards and docks, ordnance, equipment, construction and repair, and steam-engineering, and the chief intelligence officer constitute a Board on Construction, to which is referred questions relating to the general design of ships.

The office of *Naval Intelligence* is a branch of the Secretary's office, and is presided over by a line officer. Its duties are the collection of information regarding foreign navies.

A judge advocate-general is attached to the Secretary's office, and to him are referred all questions involving law and regulations, and especially those relating to courts-martial and to the promotion and retirement of officers. The office may be held by any officer of the navy or marine corps.

The active list of rear-admirals and commodores Jan. 1, 1897, with duty or station, follows. Rear-admirals—George Brown, commandant navy-yard, Norfolk; John G. Walker, chairman Lighthouse Board; Francis M. Ramsay, chief Bureau of Navigation; William A. Kirkland, commandant navy-yard, Mare Island; Lester A. Beardslee, commanding Pacific station; Thomas O. Selfridge, commanding European station. Commodores—J. N. Miller, commandant navy-yard, Boston; M. Sicard, commandant navy-yard, Brooklyn; E. O. Matthews, chief Bureau of Yards and Docks; C. S. Norton, commandant navy-yard, Washington; L. Phythian, superintendent Naval Observatory; R. R. Wallace, commandant naval station, Newport; F. M. Bunce,* commanding North Atlantic station; F. V. McNair,* commanding Asiatic station; J. A. Howell, commandant navy-yard, Washington; G. Dewey, president Board Inspection and Survey.

A list of Secretaries of the Navy follows: George Cabot, 1798; Benjamin Stoddert, 1798; Benjamin Stoddert, 1801; Robert Smith, 1801; Jacob Crowninshield, 1805; Paul Hamilton, 1809; William Jones, 1813; B. W. Crowninshield, 1814; B. W. Crowninshield, 1817; Smith Thompson, 1818; Samuel L. Southard, 1823; Samuel L. Southard, 1825; John Branch, 1829; Levi Woodbury, 1831; Mahlon Dickerson, 1834; Mahlon Dickerson, 1837; James K. Paulding, 1838; George E. Badger, 1841; Abel P. Upshur, 1841; David Henshaw, 1843; Thomas W. Gilmer, 1844; John Y. Mason, 1844; George Bancroft, 1845; John Y. Mason, 1846; William B. Preston, 1849; William A. Graham, 1850; John P. Kennedy, 1852; James C. Dobbin, 1853; Isaac Toucey, 1857; Gideon Welles, 1861; Gideon Welles, 1865; Adolph E. Borie, 1869; George M. Robeson, 1869; Richard W. Thompson, 1877; Nathan Goff, Jr., 1881; William H. Hunt, 1881; William E. Chandler, 1882; William C. Whitney, 1885; Benjamin F. Tracy, 1889; Hilary A. Herbert, 1893; John D. Long, 1897; Wm. H. Moody, 1902; Paul Morton, 1904.

G. W. MELVILLE.

NEAGH, LOUGH, Ireland, a lake in Ulster, fed by the Blackwater and Upper Bann, and drained by the Lower Bann north into the Atlantic; length, 17 miles; width, 10 miles. Canals connect it with central Ireland. C.L.S.

NEAGLE, JOHN, an American painter; born in Boston, Mass., Nov. 4, 1799. He was self-taught as an artist, after his marriage receiving instruction from his father-in-law, Thomas Sully. In 1824 he took up the specialty of portrait painting and rapidly grew in favor with connoisseurs. He was director of the Pennsylvania Academy in

*Have the rank of rear-admiral while in command of stations named.

1830, and in 1835 was elected the first president of the Artists' Fund Society of Philadelphia. His most important works include the full length of *Patrick Lyon at the Forge* (1826), which is now in the Academy of Fine Arts in Philadelphia; and the portraits of Henry Clay, George Washington, Gilbert Stuart, Matthew Cary, Bishop Meade of Virginia, Judge Sharswood, Theodore Parker, and others. He died in Philadelphia in 1865.

W.M.C.

NEAL, David Dolloff, an American artist; born in Lowell, Mass., Oct. 20, 1838. He received his early education in the grammar school at Lowell and in the high school at Lawrence, Mass., and studied art at the Munich Royal Academy (where he won the Great Medal) and in Paris. His earlier works were mostly of a historical romantic character, some of which are: *Mary Stuart and Rizzio; Oliver Cromwell Visits John Milton; James Watt; Nuns at Prayer; In the Crypt; Retour du Chasse;* etc. He has latterly turned his attention more to portraiture, and divides his time between the United States and Europe. He has painted portraits of Adolph Sutro, Rev. Mark Hopkins, etc. E.E.T.

NEANDERTHAL, Germany, a valley in the Rhine basin, Prussia, six miles east of Dusseldorf between the latter city and Elberfeld. It is noted for its picturesque and rocky scenery, and the limestone cavern where, in 1856, the skeleton of the Neanderthal man, a pre historic dolichocephalic type, was unearthed from the floor of the cave. The skeleton has been the subject of much scientific discussion and disagreement. C.L.S.

NEB-NEB, the local name of the pods of the *Acacia nilotica*, one of the extensive genus of trees and shrubs of the mimosa section of the bean family, *Leguminosæ*. W.R.B.

NEBO, Mount. See Palestine, Vol. XVIII, p. 177. A mountain in Utah; q.v., Vol. XXIV, p. 24.

NEBRASKA has an area of 77,510 square miles, of which 670 are water surface, leaving 76,840 square

STATE SEAL OF NEBRASKA.

miles, or 49,177,600 acres, of land surface. The state had long been known as the Blackwater State, when the legislature, in 1895, by joint resolution, provided that Nebraska should thereafter, in a popular sense, be known and referred to as the "Tree-Planters' State," and declaring that the flower known as the goldenrod should be the floral emblem of the state. Population of the state in 1900, 1,068,539.

The population in 1890 was 1,058,910, that of 1880 was 452,402. The gain of 9,629 for the 10 years (1890–1900) made an increase of 0.9 per cent. The relative position among the states in 1890 was 26th, that of 1900 was 27th, and a gain in density of population within the same period was made, from 13.8 to the square mile to 13.9. In 1900, there were three cities in Nebraska having a population of 8,000 and upward, in which resided 168,725 of the inhabitants of the state, constituting 15.8 per cent of the entire population. The relative proportion of males to females was 564,592 to 501,708. The percentage of native-born citizens was 83.4; the number of negroes within the state, 6,269,—a decrease of 2,644 over the number in 1890.

Agriculture and grazing are the chief industries. Corn and grass, being "staples," indicate, also, the position of the state in regard to the fattening of cattle and hogs. The relative importance of the farm products is seen by the following figures, tabulated from the 1900 census reports:

Crops.	Acres.	Bushels.	Value.
Corn	7,335,187	210,974,740	$51,251,213
Wheat	2,538,949	24,924,520	11,877,347
Oats	1,924,827	58,007,140	11,333,393
Barley	92,098	2,034,910	545,432
Rye	178,920	1,901,820	712,759
Buckwheat	980	8,629	5,109
		(tons)	
Hay and forage	2,823,652	3,517,495	11,230,901
Potatoes	79,901	7,817,438	1,734,666

During the decade 1880–90 Nebraska passed ten states that had a larger cereal acreage in 1880, and took the fifth place. The growth of all agricultural interests during the period mentioned was very marked. The number of acres of farm-lands since 1890 has increased over 8,000,000 acres; the number of acres of meadow-land mown for hay increased 1,500,000; the number of swine has increased 312,353; the number of milch cows has increased 7,499, or 1.5 per cent; the number of "other cattle" on farms received an addition of 1,026,147.

Nebraska stood fourth in the acreage of flax, third in the production of hemp and made an excellent showing in hay, potatoes and broom-corn. The census reports showed 121,525 farms, of an average size of 246 acres and aggregating 29,911,779 acres. The number in 1890 was 113,608, in 1880 was only 63,387, and in 1870 there was but 12,301 farms in the entire territory now embraced in the limits of the state. The total value of lands, fences, buildings, machinery, implements and live-stock was given at $747,950,057; the number of horses, 795,318; mules, 55,856; neat cattle, 3,176,243; swine, 4,128,000; lambs, 175,323, and the number of sheep, 335,950.

Beginning with 1890 the culture of the beet-root for the purpose of sugar-making became a recognized industry of importance. Up to 1896, 27,417,200 pounds of sugar had been made from the beets raised in Nebraska, the producers of the beet-roots receiving, in addition to an average of about five dollars per ton from the sale of the crop, a bounty from the state, paid in 1891 and 1895, of $61,067, and a bounty paid by the general government, paid in 1892, 1893 and 1894, of $249,724, making a total bounty of $310,791. That the business is a profitable one for the agriculturist is proven by the fact that the industry has increased within the six crop seasons from 1,400,000 pounds of sugar in 1890 to

about 9,000,000 pounds in 1895. Alfalfa is considered one of the most profitable of the plant crops raised in Nebraska, and is becoming more widely raised throughout the state.

Stock-raising has been an important and profitable industry from the time of the earliest settlement of Nebraska. Statistics are not available as to the total shipments of stock, but to the single stock-yards of South Omaha in 1894 there were shipped 829,171 head of cattle, 1,904,238 head of hogs, 252,218 head of sheep and 8,122 horses and mules. Dairy-farming has taken a strong hold in Nebraska, and has increased more than 500 per cent in the value of products marketed during the decade 1885–95.

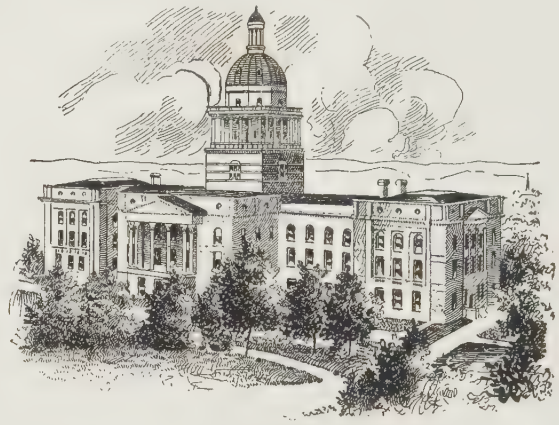
One of the greatest aids to successful farming in many parts of the state is irrigation. In 1895, 2,219 miles of irrigating-canals were in operation, the cost of construction was $2,750,000, the number of acres covered was 1,061,017, and the estimated increase in land value by reason of the work was $9,061,440. Under the new law which went into effect in 1895, proposed irrigation was entered with the state board of irrigation to the extent of 2,111 miles of canals, estimated to cost $6,209,285; the number of acres to be covered was 2,367,689, and the increase in land values was estimated at $18,941,512. The water is abundant for irrigation purposes in the greater part of the state where it is required, and legislation favorable to the work is passed by each succeeding legislature. (See IRRIGATION, in these Supplements).

Fruit-growing has become, of late years, an important agricultural industry. Apples, especially, thrive in all parts of the state, and there is no county without apple orchards. Grapes, plums and cherries make large returns, as do the small fruits, strawberries, raspberries and blackberries. A report made in 1900 showed the number of fruit trees in the state to be 6,240,118, an increase of 4,399,414 over the number in 1890.

Although popularly believed to be almost without timber, Nebraska has some very fine pine, red cedar, white oak, hickory, black walnut and poplar. A resolution of the legislature, calling for facts on the timber-supply of the state, resulted in a report being made by counties in 1894, which placed the number of forest trees in the state at 61,807,769. The cottonwood, probably the largest tree of the state, grows in all sections, as does the white elm. Much attention is being given to planting quick-growing timber, among which the cottonwood takes the lead. Interest is stimulated in this matter by the legislative christening of the state, referred to heretofore in this article. The report of the state botanist gives the number of trees indigenous to Nebraska at 62, and the number of shrubs at 69.

The census returns of 1900 showed 5,414 specified manufacturing industries, which had an aggregate capital of $71,982,127; employing 24,461 hands, to whom $11,570,688 were paid as wages, and turning out $143,990,102 worth of finished products. The leading industry was slaughtering and meat-packing, wholesale, which yielded a revenue of $71,018,339. Other important branches of manufacturing were flouring and grist mill products, brick and tile, car and general shop construction, lumber and planing-mill products, cheese, butter and condensed milk, and saddlery and harness.

The report of the state auditor for 1900 shows the total railroad mileage in Nebraska for the



CAPITOL BUILDING, LINCOLN.

year ending June 30, 1900, to have been 5,700. The total assessed valuation of the entire number of roads amounted to $27,939,178. The telegraph lines of the state had in operation 2,973 miles, which were assessed at $192,324. The sleeping and dining cars operated within the state were assessed at $75,190.

The state banking board reported, for the year 1895, 447 commercial and savings banks in operation in Nebraska, with an aggregate authorized capital stock of $9,216,525. During the preceding year 11 new banks were organized, and 46 discontinued business. The banks still continuing in business reported resources and liabilities to the amount of $26,764,226, general deposits of $14,200,775, undivided profits of $1,229,848, and loans and discounts outstanding to the amount of $19,085,793. About 110 national banks were doing business in the state, whose combined capital was approximately $9,940,000. At the close of 1900 there were 60 building and loan associations in the state, whose combined assets amounted to $3,332,781; their paid-up capital stock, $2,744,413; and who received as interest for the year $505,182.

The statistics for the school year ending July 8, 1899, were as follows: Number of children in the state between the ages of 5 and 21 years of age, 372,764; enrollment, 277,765; pupils over 21, 886; under 5 years of age, 1,106; total number enrolled in the public schools, 274,282. The number of school districts in the state was 6,693; the number of schoolhouses, 6,733; the number of teachers 9,463, of whom 2,062 were males and 7,401 were females; the average monthly wages paid to males $46.26, to females $36.90. The value of the school property of the state was $9,591,134, divided as follows: Schoolhouses, $6,229,102; sites, $1,642,594; text-books, $443,609; apparatus, maps, charts, etc., $330,514; and other property, $244,020. The receipts of the school fund for the year, including the amount on hand at the beginning of the fiscal term, were $3,737,950; the total expenditures, $3,-

815,593. Of this expense, the largest item was the amount paid to teachers, which was $2,498,766. The number of new schoolhouses built during the year was 189, costing, for the buildings and sites, the sum of $238,944. There were enrolled in the different institutes held during the year, 8,843 teachers, and 149 instructors were engaged, which cost the sum of $20,557. In addition to the public schools, there were 212 private schools. Among the institutions of higher education in Nebraska, the State University (q.v., in these Supplements) stands at the head. The Nebraska Wesleyan University is also a flourishing institution; the voluntary subscriptions made in 1895 extinguished a debt of $50,700. The Presbyterian Church controls the University of Omaha, located at Bellevue; the Christian Church, the Cotner University, at Bethany; the Seventh-Day Adventists, the Union College, at College View; the Congregational Church, Doane College, at Crete; the Christian Church, Fairfield College, at Fairfield; the Congregationalist Church, Gates College, at Neligh; the Roman Catholic Church, Creighton University, at Omaha; the Methodist Episcopal Church, the Nebraska Wesleyan University, at University Place; and the United Brethren, York College, at York.

The receipts of the state treasurer for the biennial period ending Nov. 30, 1900, were $6,038,179; the disbursements for the same period amounted to $5,423,161. The cash on hand at the time mentioned was $615,018. The total state debt reported Dec. 1, 1894, was (1900) paid up. The total valuation of all property for the purposes of taxation in 1895 was $183,717,498, the total state levy, in mills, being 6.84.

At the beginning of 1895 the National Guard of Nebraska consisted of one brigade, composed of two regiments of infantry, one battery of light artillery and one troop of cavalry. The total strength, officers and enlisted men, was 1,202. The infantry is armed with Springfield rifles; the artillery has two Rodman guns; the cavalry carries carbines. Twelve independent commands are located at different points within the state. The authorized strength of the guard is 2,000, and within the state there are 135,000 persons liable to military duty. The appropriation of $30,000 in 1895 was supplemented by a Federal appropriation of about $7,000, mainly in supplies and equipage.

Nebraska had, in 1890, 2,797 church organizations, 1,822 edifices, a membership of 194,466, which is 18.36 per cent of the population, and church property of the value of $6,443,689.42. Organizations were represented, of which the following were the most prominent, in point of numbers: The Baptists, all bodies, 284; Roman Catholics, 213; Congregationalists, 172; all Lutheran bodies, 387; all Methodists, 738; all Presbyterians, 278; Protestant Episcopals, 110; and United Brethren, 176.

The charitable, correctional and penal institutions of Nebraska are given in the following column, together with their location, number of inmates at the beginning of 1895, and the cost of maintenance for the years 1893 and 1894:

Institution.	Location.	Inmates	Maintenance.
State Penitentiary	Lancaster.	351	$106,580
Nebraska Hospital for the Insane	Lincoln.	341	128,000
Asylum for the Incurable Insane	Hastings.	447	134,000
Norfolk Hospital for the Insane	Norfolk.	191	69,272
Institution for Feeble-minded Youth	Beatrice.	191	72,000
Institution for the Blind	Nebraska City.	105	49,000
Institute for the Deaf and Dumb	Omaha.	186	42,000
Soldiers' and Sailors' Home	Grand Island.	210	17,000
State Industrial Sch'l	Kearney.	219	84,000
Nebraska Industrial Home	Milford.	52	25,000
Girls' Industrial Sch'l	Geneva.	80	40,000

On Jan. 1, 1899, there were 628 newspapers published in Nebraska. One or more papers were published in each of the 90 counties of the state, in 323 of the cities, towns, and villages, of which 89 were county seats. Of the whole number of papers published 33 were daily, 3 triweekly, 21 semiweekly, 539 weekly, 1 fortnightly, 5 semimonthly, 25 monthly, and 1 bimonthly.

The following are the principal cities of Nebraska, with the populations as given in the census of 1900:

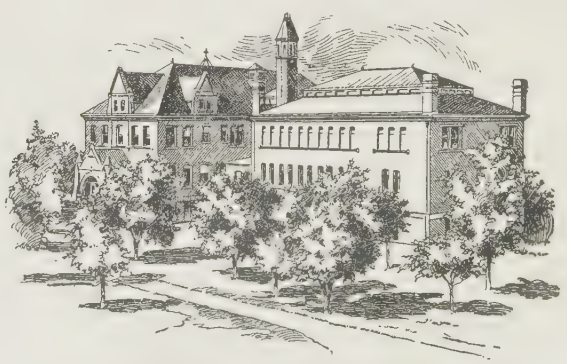
Omaha	102,555	Plattsmouth	4,964
Lincoln	40,169	Kearney	5,634
Beatrice	7,875	South Omaha	26,001
Hastings	7,188	Grand Island	7,554
Nebraska City	7,380	Fremont	7,241

State flower, Golden Rod. The following is a list of the governors of Nebraska since the date of the admission of the state into the Union, together with their respective terms of office:

David Butler	1867–71	James E. Boyd	1891–93
William H. James	1871–73	Lorenzo Crouse	1893–95
Robert W. Furnass	1873–75	S. A. Holcomb	1895–99
Silas Garber	1875–79	W. A. Poynter	1899–1901
Albinus Nance	1879–83	E. P. Savage	1901–03
James W. Dawes	1883–87	John H. Mickey	1903–
John M. Thayer	1887–91		

See also Nebraska, Vol. XVII, pp. 315–19.

Revised by R.C.A. *and* A.R.R.



LIBRARY, UNIVERSITY OF NEBRASKA.

Nebraska, University of, a co-educational institution for higher learning, situated at Lincoln, maintained and controlled by the state. It was founded by an act of the legislature in 1869. The Agricultural College is one of the departments of

the university; other departments are the colleges of arts and sciences, law, medicine, engineering and fine arts. The institution is governed by a board of six regents, elected by popular vote, and holding office for six years. Tuition is practically free, small fees being charged in the various laboratories. The first classes were organized in 1871. In 1901 there were 2,256 students in attendance, with 220 instructors and a library of 51,000 volumes. In 1898 the income from all sources was $287,000. By act of the legislature a tax of three eighths of a mill per dollar is provided for the support of the university. In addition to this there are revenues from land leases and sales under the Congressional grant of 1862 and the Morrill Fund Act for Agricultural Stations of 1890.

NEBRASKA CITY, a city and the county seat of Otoe County, Nebraska, in the southeastern part of that state. It lies on the west bank of the Missouri River, 40 miles south of Omaha and 47 miles east by south from Lincoln, and is reached by the Burlington and Missouri River and the Missouri Pacific railroads. It is connected with Payne, on the Iowa shore of the Missouri River, by means of a great steel bridge. The adjacent country is largely devoted to corn and stock raising, and Nebraska City is a market and shipping point for those industries and the seat of many manufacturing establishments, such as packing houses and distilleries, tributary to them. It was formerly the site of Nebraska Wesleyan University. The population of the city in 1900 was 7,380. W.F.J.

NEBULÆ. See ASTRONOMY, Vol. II, pp. 718–719.

NECEDAH, village of Juneau County, central Wisconsin, 48 miles N.W. of Portage, and five miles W. of the Wisconsin River. It has a good lumber business, three saw-mills, a grist-mill and a pail factory. Population 1890, 1,708; 1900, 1,209.

NECHES RIVER, a river which rises in Van Zandt County, eastern Texas, and flows about 350 miles S.E. to Sabine Lake, its waters passing thence by Sabine Pass into the Gulf of Mexico.

NECKAR, a river of Germany. See WÜRTEMBERG, Vol. XXIV, pp. 735, 737.

NECTONABES OR NEKH–NEBF, two Egyptian monarchs. See EGYPT, Vol. VII, p. 645.

NEDJED OR NEJD. See ARABIA, Vol. II, pp. 208–209.

NEEDLES are now made of many different sizes and shapes and applied to many different uses. The needle trade has become an important one, although less so in America than in Europe. In the tenth census, forty establishments were counted in America where pins and needles are made. Their total product was then valued at $1,378,000. In 1900 there were 43 manufacturing establishments reported, with a product valued at $2,738,439. See also NEEDLE, Vol. XVII, pp. 312, 313.

NEEDLES, THE, are three stacks of outlying rocks of chalk off the west end of the Isle of Wight, England. They derive their name from their peculiar shape. They are constantly subjected to the action of the waves, only three now appearing above the water conspicuously, while there were formerly five. On the outer part of the outermost rock is the Needles lighthouse, in lat. 50° 39′ N., long. 1° 34′ W.

NEENAH, a city of Winnebago County, Wisconsin, in the central-eastern part of the state. It lies on Lake Winnebago, and is reached by the Chicago and Northwestern and the Wisconsin Central railroads. It is a favorite summer resort, has some manufacturing industries, and had in 1900 a population of 5,954. W.F.J.

NEGATIVE-MAKING. See PHOTOGRAPHY, in these Supplements.

NEGAUNEE, a city of Marquette County, Michigan, in the north-central part of the northern peninsula of the state. It lies on Teal Lake, eleven miles from Lake Superior at Marquette and Presque Isle, and is a center of the iron and lumber trades. It is reached by the Chicago and Northwestern, and the Duluth, South Shore and Atlantic railroads, and had in 1900 a population of 6,935. W.F.J.

NEGLIGENCE. See NEGLIGENCE, Vol. XVII, p. 324. As to liability of employers and employees for negligence, see EMPLOYERS' AND EMPLOYEES' LIABILITY, in these Supplements.

NEGOTIABLE INSTRUMENTS, that class of contracts, usually for the payment of money, which are capable of being transferred by indorsement or delivery, or both, and upon which the assignee thereof may maintain an action in his own name. As to the various kinds of instruments which compose the class of negotiable instruments, see BILL, Vol. III, p. 582; EXCHANGE, Vol. VIII, pp. 686–696; BANKING, Vol. III, p. 272; and also in these Supplements. See also MERCANTILE LAW, in these Supplements.

NEGRI, ADA (MADAME GARLANDA), an Italian poet; born in Lodi, near Milan, February 3, 1870. She was a school-teacher in a peasant village on the Ticino during her early life. In 1892, she published a small volume of poems entitled *Fatalita*, which aroused a general interest in Italy and by 1894 had received a consideration of six editions. She received from the city of Florence an honorary stipend of $340 annually for a period of ten years, and was appointed an instructor in literature at the Scuola Normale of Milan. Her later volume of verse, entitled *Tempeste* (1895) is a German translation by Johr. Her poems are largely devoted to the sufferings of the poor and are a direct appeal to the working classes and the Italian peasantry. W.M.C.

NEGRI, CRISTOFO, an Italian economist and politician; born in Milan, June 19, 1809. He studied at Pavia and in German universities, and was a law professor at Padua from 1843 to 1848. He took a prominent part in the Italian rising of 1848, thus losing his professorship at Padua. He then became president of the University of Turin, and was long chief of the consular service. In 1867 he founded in Florence the Italian Geographical Society, of which he was professor for many years. His published writings include *A Comparison between Ancient and Modern Political History* (1866); a book on Arctic exploration (1880), and *The Life of Giorgio Pallavicino*

(1882). He was largely instrumental in enlarging the commercial relations of Italy with other nations. He died in Florence, Italy, February 18, 1896. W.M.C.

NEGRI SEMBILAN ("Nine States"), a number of small states in the interior of the Malay Peninsula, confederated in 1889 under a British officer. The confederacy comprised Sri Menanti, Rembau, Johol, Tampin, and other small states, numbering, as its name implies, nine in all, to which, in 1895, Sungei Ujong (including Jelebu) was added. Area, 3,000 sq. miles; pop. 1891, 65,219. See MALAY PENINSULA, Vol. XV, p. 325.

NEGRITO RACE. See MALAY PENINSULA, Vol. XV, p. 325; and PHILIPPINE ISLANDS, Vol. XVIII, p. 766.

NEILL, EDWARD DUFFIELD, an American historian; born in Philadelphia, Aug. 9, 1823. He was graduated from Amherst College in 1842 and studied at the Andover Theological Seminary. He was superintendent of the Minnesota public schools from 1851 to 1853 and was chancellor of the State University of Minnesota from 1858 to 1861. He was a hospital chaplain in the army during the Civil War. In 1863 he was an assistant private secretary to President Lincoln and President Johnson. In 1869 he was for a short time consul at Dublin. He was president of Manchester College, St. Paul, Minn., from 1873 to 1884. His books include *History of Minnesota* (1858); *Terra Mariæ, a History of Early Maryland* (1867); *History of the Virginia Company of London* (1869); *English Colonization of America During the Seventeenth Century* (1871); *Minnesota Explorers and Pioneers* (1881); *Virginia Vetusta* (1885); *Virginia Carolorum* (1886); *Concise History of Minnesota* (1887). He died in St. Paul, Minn., Sept. 26, 1893. W.M.C.

NEILL, THOMAS H., soldier, was born in Philadelphia on April 9, 1826, and was graduated from West Point in 1847. He served with distinction in the Civil War, being brevetted major for gallant and meritorious work at Malvern Hill, brevetted lieutenant-colonel for similar service at Chancellorsville, brevetted colonel for like performances at Spottsylvania, and brevetted major-general of volunteers for gallant and meritorious service throughout the war. After the war he remained in the army in various capacities, including four years' service at West Point. In 1879 he was colonel of the Eighth cavalry regiment, and on April 2, 1883, he was retired for disability. He died on March 12, 1885. W.F.J.

NEILLSVILLE, a village, the capital of Clark Co., Wis., 60 miles N.N.E. of La Crosse, on the Chicago, St. Paul, Minneapolis and Omaha railroad; the center of a lumbering and agricultural district; has wood-working industries, a foundry, a machine-shop, and a pump factory. Pop. 1890, 1,936; 1900, 2,104.

NEILSON, LILIAN ADELAIDE, an English actress; born in Leeds, Yorkshire, March 3, 1848. Her father was a Spaniard and her mother English. Her real name was Elizabeth Ann Brown, though she was also sometimes called Lizzie Bland (Bland being the name of her stepfather). As a young girl she worked in a mill at Guiceley and then as a nurse maid, and, upon learning the story of her birth, ran away from her mother, an actress, and went to London. There she was a bar-maid; gave dramatic recitations from Shakespeare, and made her *début* in 1865 as *Julia* in *The Hunchback* at Margate, and in the same year came forward as *Juliet* at the Royalty Theater in London, with success. During the next few years she appeared at the Princess's Theater in *A Huguenot Captain* and *Lost in London*, at the Gaiety in *Uncle Dick's Darling*, at Drury Lane in *Amy Robsart*. In 1872 she reappeared as *Juliet* in the maturity of her powers, and was recognized as one of the finest exponents of Shakespearian female character that the modern English stage had produced. She was next the heroine in Tom Taylor's *Anne Boleyn*. In 1872 she visited the United States, playing in Booth's Theater, New York, and in Boston, where she was equally successful. She made four visits to the United States. In 1877 she was engaged at the Haymarket Theater, London, in a series of Shakespearian representations. Her great success was due to her beauty, girlish grace, splendid voice, and dramatic power. Joseph Knight wrote of her: "As a tragedian she had no English rival during the last half of this century." She died suddenly in Paris, France, Aug. 15, 1880. W.M.C.

NEJIN. See NYEZHIN, Vol. XXVIII, p. 268.

NELIGH, a village of Antelope County, eastern central Nebraska, 120 miles N.E. of Lincoln, on the Fremont, Elkhorn and Missouri Valley railroad. It has a flouring-mill, a saw-mill, and a newspaper. Population 1890, 1,209; 1900, 1,135.

NELSON, a city, the capital of Nuckolls Co., Neb., in a farming and stock-raising district, 18 miles E. of Fairfield; has banks, 2 newspaper offices, and large brick-works. Pop. 1900, 978.

NELSON, SAMUEL, an American jurist; born in Hebron, N. Y., Nov. 10, 1792. He graduated at Middlebury College, Vt., in 1813; studied law, and commenced practice in Cortland, N. Y., in 1817. He was a Presidential elector in 1820; a member of the State constitutional conventions in 1821 and 1846; and was appointed a circuit judge of New York in April, 1823. After eight years' service upon the circuit bench he became an associate judge of the New York Supreme Court, and six years later its chief justice. He was made an associate justice of the United States Supreme Court in 1845. In 1871 he was appointed a member of the Alabama Claims Commission. He resigned his judicial position in 1872, and died at Cooperstown, N. Y., Dec. 13, 1873. E.E.T.

NELSON, THOMAS, an American statesman; born in York County, Va., Dec. 26, 1738. He was educated at Trinity College, Cambridge, and on his return was elected to the Virginia House of Burgesses. He was a member of the Provincial conventions of 1774–76 and of the Continental Congress, and a signer of the Declaration of In-

dependence. In 1774 he was appointed commander-in-chief of the State forces. In 1780 he pledged his own credit to raise funds to provide for the French fleet and to pay Virginia troops. In 1781 he was acting governor of the State, headed the militia in co-operation with Lafayette, and participated in the siege of Yorktown. Completely impoverished by his patriotic expenditures, he died at Yorktown, Jan. 4, 1789.

E.E.T.

NELSON, WILLIAM, naval commander, was born at Maysville, Ky., in 1825, and served in the navy in the Mexican War. In the fall of 1861 he was transferred to the army, and was largely engaged in raising and training regiments. He commanded a division of Buell's army at Shiloh, was wounded at Richmond, Ky., and commanded at Louisville when Bragg threatened that city. He was made major-general of volunteers in 1862, and was fatally shot in a personal quarrel on September 29, 1862. W.F.J.

NELSON RIVER, a river in the Canadian North-West, in the District of Keewatin. It flows from Lake Winnipeg N.E. through Split Lake to Hudson's Bay. Its length is 450 miles, but the navigation is much broken by rapids. It is known to the Indians as the Katchewan.

NELSON'S FARM, BATTLE OF. See FRAZIER'S FARM, BATTLE OF, in these Supplements.

NELSONVILLE, an important village of Athens County, Ohio, in the southeastern part of the state. It is on the Hocking River, 55 miles southeast of Columbus, and is reached by the Columbus, Hocking Valley and Toledo railroad. Its population in 1900 was 5,421. W.F.J.

NELUMBO, the common name of *Nelumbium*, a genus of the water-lily family, with very large platter-shaped, centrally peltate floating leaves, great flowers and a top-shaped receptacle bearing a dozen or more nutlets (like small acorns) separately immersed in as many hollows. *N. luteum* is an American form with yellow flowers, and is often called water-chinquepin. *N. speciosum* is the lotus or sacred bean of India, with pinkish flowers, and is cultivated in conservatories.

NEMATHELMINTHES. See NEMATOIDEA, Vol. XVII, pp. 333–334.

NEMATOGNATHI, the order of cat-fishes. These are carnivorous fishes, inhabiting fresh waters chiefly. The name cat-fish was suggested by the barbels at the corners of the mouth. There are no scales. They have many affinities with the sturgeons. Some authors include all the cat-fishes in the family *Siluridæ*, while others divide the order into several families. See SILURIDÆ, Vol. XXII, p. 75.

NEMEA, a valley in Argolis, Greece, between Cleonæ and Phlius, noted chiefly as the place where Hercules encountered the Nemean lion. This was the first of "the twelve labors of Hercules," performed at the bidding of Eurystheus. The Nemean lion was a monstrous beast, the offspring of Typhon and Echidna. After a fierce encounter, Hercules overcame the animal by strangling. In the Nemean Valley there was a temple sacred to Jupiter (Zeus), surrounded by a grove, in which the Nemean games were celebrated every alternate year. See GREECE, Vol. X, p. 59.

NEMI, LAKE, Italy, a picturesque sheet of water in the province of Rome, midway between Albano and Velletri on the Appian Way, and on the railroad to Anzio, 17 miles southeast of Rome. It is the *Lacus Nemorensis* of the ancient Latins, and occupies the crater of an extinct volcano in the Alban Mountains, five miles in circumference, and 1,200 feet above the level of the Mediterranean. (See LATIUM, Vol. XIV, p. 344.) It is surrounded by thick woods which in Pagan times were famous for the worship of Diana; the ruins of a temple dedicated to the goddess exist near the traditional spring of Egeria, and the lake, owing to its smooth and unruffled surface, was called "Diana's mirror." The search of divers in 1895 verified the tradition that Roman emperors had a floating summer palace on this lake, a large submerged vessel being discovered in 80 feet of water. C.L.S.

NEMICHTHYIDÆ, a family of eels or apodal fishes, with greatly elongated body. They are rare forms from deep-sea waters. The snipe-fish (*Nemichthys*) is the best-known representative.

NEMOURS, an ancient town in the French department of Seine-et-Marne, 40 miles S.E. of Paris by rail. It gave a ducal title to the second son of Louis Philippe, born in 1814. Population, 5,000.

NEMOURS, LOUIS CHARLES PHILIPPE RAPHAEL, D'ORLÉANS, DUC DE, a French soldier; born in Paris, October 25, 1814. He was the second son of King Louis Philippe. In 1831 he was elected king of the Belgians, but by the advice of his father, refused the dignity. In 1836 he went to Algeria as adjutant-general of the French army, and commanded a brigade of infantry at the siege of Constantine. In 1840 he espoused Victoria Augusta Antoinette, duchess of Saxe-Coburg-Gotha, and in the following year signalized himself in the decisive campaign against Abd-el-Kader. On the death of the Duc d'Orléans he was declared regent by the Chambers, and in 1848, after the abdication of Louis Philippe, was left in charge of the interests of his nephew, the Comte de Paris, but took no decisive action. He was so unpopular that he found it wise not to press his claims, but to remove to England. He returned to France in 1870 but played little part in the subsequent attempts to effect a fusion of Orleanist and Legitimist pretensions, although in 1873 he took part in the Frohsdorf interview with the Comte de Chambord. His political fortunes were seriously affected by the anti-royalist measures of 1886, and he spent his last years in retirement. He died at Versailles, June 25, 1896.

W.M.C.

NEODESHA, a city of Wilson County, southeastern Kansas, at the junction of the Fall and Verdigris rivers, 14 miles N. of Independence, on the Missouri Pacific and the St. Louis and San Francisco railroads; has a pottery, flour-mills, and grain-elevators and railroad machine-shops; has coal and natural gas in the vicinity; also engaged in farming

and stock-raising. Population 1890, 1,528; 1900 (12th census), 1,772.

NEO-LAMARCKISM AND NEO-DARWINISM are two terms of recent origin—the former first used in America by Professor Alpheus Spring Packard, the latter in England by the late Dr. George John Romanes—as designations of two opposing schools of evolutionists, and are accentuated uses of older terms, for the purpose of more accurately defining points of difference. The common ground of natural selection being held by both schools, their differences are indicated in the following definitions of the terms: Neo-Lamarckism is the belief of those who hold that organic evolution has been effected not solely (as expounded by Lamarck, who had not perceived natural selection) by means of the occurrence and inheritance of somatogenetic (acquired) characters, but in company with the qualifying influence of natural selection. Darwinism, as expounded by Charles Darwin himself, admits the transmission of acquired characters. Neo-Darwinism is the belief of those who claim that natural selection has been the only modifying influence in the evolution of species, and that the material for its action has been only plasmogenetic (congenital) characters. The controversy, as it has been waged between the two schools, is more or less enigmatic to all others than trained biologists; but, if we divest it of its quasi-scientific (and perhaps somewhat labored) terminology, it seems possible to state it briefly as follows: When Darwin advanced his doctrine of natural selection he both saw and confessed that it could not explain the *first origin* of anything. Selection cannot be exercised upon variations until variations have actually taken place. Conseqently the *cause* of variations cannot be accounted for by laws which are only concerned in eliminating all variations of a certain sort after they have arisen. Darwin was content, for the time being, to let this problem rest as belonging to a field of causes and laws as yet unknown. Naturally, a great many evolutionsts have studied over this perplexity of the law which causes (or the conditions which determine) variations, and they regard this as the one great problem of biological science. Perhaps first among them is Professor August Weismann, of Freiburg, whose new theories caused the Darwinians to divide into rival factions. In Darwin's system, natural selection could only act upon or through the individual. It could have no influence upon the species, or on future generations, except through its operation on individual organisms. It was therefore unable to account for definite lines of variation along which new forms seem to have been developed. Weismann saw the necessity for a theory which would explain these lines of variation (the origin of new species), and conceived the idea of inventing an agency, together with certain machinery whose function it is to shape these variations, which should *provide beforehand* that certain carefully selected improvements shall and must arise leading on to the establishment of higher races in the future. He perceived that something was needed to perform the function of design, of will and foresight. This, of course, is a wide departure from the meaning of natural selection as advanced by Darwin, and as understood by most of his followers, now designated as Neo-Lamarckians. Treated as a *science*, they say natural selection was altogether mechanical, and they regard any invention of an agency which directs beforehand the paths which the variations shall follow, as quite unscientific. Weismann—we do not use his involved form of definition—says there must be certain cells in the more complex organisms which are separate and distinct from the mass of cells constituting the rest of the body, and to these separate cells he ascribes the special function of directing those variations which are to determine the future lines of development. The Neo-Lamarckians hold that there can be no warrant from actual experience in this assumption.

They admit that in every complex organism there are different cells in each different part of the common structure, and each of these different kinds of cells is clearly different, because they are to be seen discharging different functions. Those which are set apart for the functions of reproduction can be distinguished like the rest. But they hold that Weismann's original distinction in his special cells is something which he has assumed as an intellectual necessity; and that the whole reasoning rests on an abstract conception of the mind. His argument is, that there must be something permanent and immortal in organic life; otherwise we never could account for the law of heredity. For what is heredity? Simply the survival—the immortality—in the offspring of something which had lived in the parent. Those creatures (the protozoa) wholly composed of one cell, he says, are immortal. They never die. They simply divide and the separate bits live on and similarly multiply, again and again, forever. The multicellular creatures die—as to the individuals—but bits of them, too, must live on also; else there is no explanation of the hereditary succession of life. We must therefore suppose, he says, that the immortality lies in special cells differing from all the other cells which make up the mass of living bodies, and that in these special cells, called the germ-cells, all the potentialities of heredity and of generation are "provided for." Weismann realized that in order to defend the position of his germ-cells he must deny that they can be at all accessible to outward influences. They must exist, as it were, in a sphere of unapproachable and divine independence. To suppose them capable of being changed or altered in any way, by accidents of circumstance, would be to impair their dignity and cast a doubt upon the certainty of their work. That work must be determined by purely internal and innate powers and gifts. These cells, therefore, must not be thought of as taking any part in the mere superficial changes which go along with the changes of outward life; for these outward superficial changes are what constitute adaptation and furnish one of

the chief elements in the Neo-Lamarckian theory of evolution. The Neo-Lamarckians believe, as did Darwin, that the main factor in the progress of evolution and the origin of species rests and depends upon the seizing and holding, by each organism, of the new characters which are acquired from time to time; that these characters are molded by the action and reaction of the external world, and are transmitted from parent to offspring by ordinary generation.

Weismann cuts himself sharply asunder from this idea, which was not only held by Darwin but by Lamarck before him. He declares it to be utter fallacy. His newly imagined germ-cells must be wrapped about with a mantle of holiness. They are the sole determinants in hereditary transmission; environment must never affect them; nothing must interfere with their sublime functions. He is willing to retain Darwin's formula of natural selection, but it is only for occasional or special uses. These most potent germ-cells, he says, were never *acquired* by the parent nor ever transmitted, in the real sense, by the parent to the offspring. All characters in the offspring are due to "primary" changes in the germ. They were "provided beforehand." If, therefore, the Neo-Darwinian should deride the Lamarckian doctrine that the woodpecker's bill is lengthened through use and inheritance, he may, not unlikely, be asked whence came the sanction for Weismann's belief in these stupendous potentialities which determine even the minutest variability in all species and types through all eternity, and which came:—

"Into this universe, and Why not knowing,
Nor Whence, like water willy-nilly flowing."

Mr. Herbert Spencer, *facile princeps* among the exponents of Darwinian — or Neo-Lamarckian — evolution, holds views strongly opposed to those of Weismann; and it seems reasonable to believe — if for no other reason than that the *onus probandi* rests with the newer school — that Spencer has the best of the argument. The Neo-Lamarckian view has long had possession of the field, and the Neo-Darwinian ideas of Weismann seem composed of assumptions which cannot be verified. The author of the new cult must prove his case; it is not incumbent upon the older school to disprove. That variations in organic forms do take place, and *apparently* through the influence of external conditions; and that new characters, seen for the first time in a parent, are seemingly inherited by his offspring, there has been (the Lamarckians hold) no consistent effort to disprove. Weismann's only chance to demonstrate the falsity of this claim is, they say, only through his assumptions and hypothetical machinery.

But, it may be asked, what is the secret of the huge importance of this question?

It is that an idea has grown (seemingly through a misconception, or, at least, an inadequate realization of the actual differences), that the older Darwinian view excludes the possibility of teleological explanations, and that the new theory of Weismann admits of them. Weismann dwells on the "purposefulness seen in organisms," and declares that natural selection, as invented by Darwin, is helpless toward explaining the origin of anything. The Darwinians admit the latter implication without questioning; but reply that when Professor Weismann succeeds in giving a thoroughly intelligible account of the *machinery* through which he explains the origin of things, he will have earned not merely their attention, but that of an entire waiting world. As for the teleological possibilities surrounding the doctrines of either school, it is fair to say that the idea of design, as an agency in creation, is no farther away from the older Darwinian than it is from the Weismann view. Not only do the adherents to the older school disclaim pure materialism as a necessary consequence of their system, but, throughout the writings of Mr. Herbert Spencer, he has never failed to breathe a spirit of real reverence for the "Unknowable," the recognized power which lies underneath and behind all observable phenomena. Biology, as a science, does not deal with mental agencies; but, as between the teleological implications of one or the other school, no mind which is both unprejudiced and well informed will be likely to see less of grandeur in the idea of an Unknowable Power which is evolving order out of confusion by working in and through the external conditions which produce variations, than in the accomplishment of a similar result through the media of primordial determinant germ-cells "provided beforehand."

For a fuller treatment of the Weismann theory, see HEREDITY, in these Supplements.

J. F. CARGILL.

NEOSHO, a city and the capital of Newton County, southwestern Missouri, 22 miles S. of Carthage, on the Kansas City, Pittsburg and Gulf and the St. Louis and San Francisco railroads; has an extensive canning factory, plow and wagon factory, foundries, flour and woolen mills. The place is frequented on account of its well-known mineral springs. It has a fish-hatchery, established by the government. Population 1890, 2,198; 1900, 2,725.

NEOSHO RIVER, the chief stream of southeastern Kansas, rises in the east-central part of that state and flows into Indian Territory, and thus into the Arkansas River. Emporia, Burlington, Erie, Oswego, and other large places in Kansas are on its banks. W.F.J.

NEPENTHES. See INSECTIVOROUS PLANTS, Vol. XIII, pp. 140, 145–146.

NEPHELINE. See MINERALOGY, Vol. XVI, p. 430.

NEPHI, a city and the capital of Juab County, central Utah, 90 miles S. of Salt Lake City, on the Union Pacific and the San Pete railroads. It is in a sheep-raising district, and has numerous salt-wells. Gypsum, salt, and marble are shipped. Population 1890, 2,034; 1900, 2,208.

NEPHOSCOPE, an instrument for observing the motions of clouds. It is commonly made with a circle, marked off into degrees, within

which is a mirror. An arrangement of wires or rods is provided, so that the mirror can be viewed from a set point. In use, the circle is set with the zero point directed toward one of the cardinal points of the compass, and the cloud being viewed through a fixed point in the wires, the direction of motion is noted readily. If there are concentric circles on the mirror, the angular velocity of the cloud may be calculated; and if there are means of judging of the height of the cloud, its linear velocity may also be determined.

NEPHRIDIA. See MOLLUSCA, Vol. XVI, pp. 655, et seq.

NEPHRITE OR JADE. See MINERALOGY, Vol. XVI, p. 435.

NEPIGON OR NIPIGON LAKE, Canada, in Algoma, northwestern Ontario, is an oval-shaped expanse of water with indented shores, extending about 70 miles from north to south; it has a maximum breadth of about 50 miles and a maximum depth of 500 feet; is fed by the Gall River and other lake streams, contains numerous islands, and is 312 feet above the level of Lake Superior. 50 miles to the south, into which it discharges through the Nipigon River. At the mouth of the river is the village of Nepigon, on the Canadian Pacific railway, whence sportsmen and anglers seek the summer camping-grounds around the wooded and hilly shores of the lake. C.L.S.

NEPOMUK OR POMUK. See JOHN OF NEPOMUK, Vol. XIII, p. 729.

NEPTHYS, an Egyptian divinity. See EGYPT, Vol. VII, pp. 620–621.

NEPTUNE. See ASTRONOMY, Vol. II, 711–712.

NEREIDS, daughters of NEREUS, q.v., Vol. XVII, p. 335.

NERITIDÆ, a family of gasteropod mollusks, mostly marine. All have thick, globular shells, *Nerita* and *Neritina* are the best-known members of the family. There are over two hundred species in the family.

NÉRUDA, JAN, a Bohemian poet; born in Prague, July 10, 1834. He was one of the founders of Czech literature, and published *Knihy Versú* (Book of Verses, 1868), etc. Died in Prague, Aug. 24, 1891. See SLAVS, Vol. XXII, p. 162.

NERVES, PHYSIOLOGY OF. See EMBRYOLOGY, in these Supplements.

NERVOUS SYSTEM. See ANATOMY, Vol. I, pp. 747–775. DISEASES OF, see PATHOLOGY, Vol. XVIII, pp. 399–409.

NESS, LOCH. See SCOTLAND, Vol. XXI, p. 548.

NESTS OF BIRDS. See *Nidification*, under BIRDS, Vol. III, pp. 668, 669.

NETHERLANDS. For general article on the Netherlands, see HOLLAND, Vol. XII, pp. 61–101. The territory of the Netherlands is divided into eleven provinces and 1,123 communes, each province having its own provincial representative body. The members are elected for six years.

The following table gives the areas and the populations of the 11 different provinces of the kingdom, as reported by the census of Dec. 31, 1900:

PROVINCES.	AREA, ENGLISH SQ. MILES.	POPULATION, DEC. 31, 1900.
North Brabant	1,980	559,287
Guelders	1,965	572,787
South Holland	1,166	1,171,437
North Holland	1,070	983,826
Zealand	690	217,329
Utrecht	534	254,867
Friesland	1,282	342,286
Overyssel	1,291	338,408
Groningen	790	302,681
Drenthe	1,030	150,364
Limburg	850	285,828
Total	12,648	5,179,100

Of the total population in 1900 there were 2,560,292 males and 2,618,807 females.

The constitution of 1815 was revised in 1848, and finally completed in 1887. Under this revised constitution the "Netherlands form a constitutional and hereditary monarchy." The royal succession is in the direct male line in the order of primogeniture; in default of male heirs, the female line ascends to the throne. In default of a legal heir, the successor to the throne is designated by the King with the concurrence of both Houses of Parliament (each containing twice the usual number of members), and by this assembly alone if the case occurs after the king's death. The age of majority of the ruler is 18 years. During a minority the royal power is vested in a regent—designated by law—or in some cases in the state council.

The present royal family of the Netherlands is known as belonging to the House of Orange. This family is descended from a German count, Walram, who lived in the eleventh century. (See NASSAU, Vol. XVII, p. 245.) Through the marriage of Count Engelbrecht, of the branch of Otto, Count of Nassau, with Jane of Polanen, in 1404, the family acquired the barony of Breda and thereby became settled in the Netherlands.

The later years of William III were marred by much illness, causing at times serious apprehension as to his ability to continue his administration as sovereign, and Queen Emma was authorized to act as regent. She accepted the regency and took the oath of office Nov. 20, 1890. King William III died Nov. 23, 1890, and Wilhelmina Helena Pauline Maria, born Aug. 31, 1880, daughter of his second wife, Queen Emma, then succeeded to the throne, and married in 1901.

King William II had a civil list of $400,000, but the amount was reduced to $240,000 at the commencement of the reign of King William III. There is also a large revenue from domains, and in addition an allowance of $20,000 for the maintenance of the royal palaces. The heir-apparent has $40,000, which sum is doubled in case of a marriage with the consent of the states-general. The queen-widow receives an annual allowance of $60,000. The family of Orange is, besides, in the possession of a very large private fortune, acquired in greater part by King William I, in the

prosecution of vast enterprises tending to increase the commerce of the Netherlands.

The executive power of the state belongs exclusively to the sovereign, while the whole legislative authority rests conjointly in the king and parliament, the latter—called the states-general—consisting of two chambers. The upper or first chamber is composed of fifty members, elected by the provincial states from among the most highly assessed inhabitants of the eleven provinces, or from among some high and important functionaries, mentioned by bill. The second chamber of the states-general numbers 190 deputies, and is elected directly from among all the male citizens who are thirty years of age and are not deprived by judicial sentence of their eligibility or the administration and the disposal of their property. Voters are all male citizens, 23 years of age, who have paid either a ground-tax of at least 10 guilders, or a direct tax (personal) to an amount higher than the sum which gives partial exemption from taxation, and which varies according to population, or who are lodgers according to the precepts of the law. The total number of electors, according to the new constitution, is 290,000, which gives one voter in about 15 persons. The members of the second chamber receive an annual allowance of $800, besides traveling expenses. They hold their office for four years and retire in a body, whereas the first chamber is elected for nine years, and every three years one third retire by rotation. The queen has the power to dissolve both chambers of Parliament, or one of them, being bound only to order new elections within forty days and to convoke the new meeting within two months.

Only the government and the second chamber have the right of introducing new bills, the functions of the upper chamber being restricted to approving or rejecting them, without the right of inserting amendments. The meetings of both chambers are public, though each of them, by the decision of the majority, may form itself into a private committee. The ministers can attend at the meetings of both chambers, but they have only a deliberative voice, unless they are members. Alterations in the constitution can be made only by a bill declaring that there is reason for introducing those alterations, followed by a dissolution of the chambers and a second confirmation by the new states-general by two thirds of the votes. Unless it is declared explicitly, the laws concern only the realm in Europe, and not the colonies.

The executive authority belongs to the sovereign, acting with a cabinet council of six ministers. Each minister receives an annual salary of about $5,000.

There is a "state council" (Raad van State), appointed by the sovereign, of which council she is president. This council is consulted on all legislative and many executive matters.

On Dec. 31, 1900, the following towns, of more than 20,000 inhabitants, reported populations as follows:

	Population.		Population.
Amsterdam	520,602	Nimeguen	44,034
Rotterdam	332,185	Dordrecht	38,804
The Hague ('s Graven Hage)	212,211	Leeuwarde	33,009
Utrecht	104,194	Delft	31,878
Groningen	67,563	Bois-le-Duc ('s Hertogenbosch)	31,128
Haarlem	65,189	Zwolle	30,848
Arnhem	57,498	Schiedam	26,716
Leiden	54,421	Breda	26,156
Tilburg	47,518	Deventer	26,224
Maestricht	34,182	Helder	25,842
		Apeldoorn	26,738

The government budget for 1901 estimated the revenue at $62,280,000 and the expenditure at $64,480,000. The estimated figures for 1902 were, for the former, $64,500,000; for the latter, $69,680,000.

The national debt of the Netherlands in 1901–02 was $481,412,685.

The southern and eastern frontiers are defended by few fortresses. The most effective means of defending the Netherlands consists in piercing the dykes and inundating a great stretch of land between the sea and the river, the Lek. The few roads lying above the level of the water are guarded by fortresses connected with each other; the river can be defended by gun-vessels if necessary. A large part of the province of Utrecht, besides North and South Holland, with the principal towns, is thus secured.

The army of the Netherlands, which was reorganized nearly on the system of Germany in 1881, is formed partly by conscription and partly by enlistment, the volunteers forming the stock, but not the majority of the troops.

The regular army on footing of war consisted, in 1900, of 46,039 infantry, 3,132 cavalry, 1,632 engineers, 16,080 artillery; in all, about 68,000 men, including officers and special services.

In peace the total number of the army on June 1, 1900 was 25,762 men, and about 1,911 officers Included in the infantry are 1 regiment of guards and 8 regiments of the line; there are 3 regiments of cavalry, 1 battalion of sappers and miners, 3 regiments of field artillery, 4 of fortress artillery, 1 corps of light-horse artillery, 1 corps of pontooners, and 1 corps of torpedoists.

		Sq. Miles.	Population 1897.
Java and Madura		50,554	26,125,053
Island of Sumatra	Sumatra, west coast	31,649	1,353,315
	Sumatra, east coast	35,312	335,432
	Benkulen	9,399	158,767
	Lampongs	11,284	137,501
	Palembang	53,497	692,317
	Atjeh	20,471	531,705
Riau-Lingga Archipelago		16,301	107,861
Banca		4,446	93,600
Billiton		1,863	41,558
Borneo, west coast		55,825	370,775
Borneo, south and east districts		156,912	809,803
Island of Celebes		49,390	1,448,722
Island of Menado		22,080	549,138
Molucca Islands		43,864	399,208
Timor Archipelago		17,698	119,239
Bali and Lombok		4,065	1,044,757
New Guinea to 141° E. longitude		151,789	200,000
Total		736,329	34,090,000

The colonial possessions of the Netherlands in the East and West Indies on Jan. 1, 1898, were estimated to embrace an area of 783,000 square miles, with an aggregate population, according to the latest returns, of 35,000,000, or more than seven times as large as that of the mother country. The preceding table formulates the estimated summaries for the several Dutch possessions in the East Indies (some still unexplored not being included):

For history and geography, see HOLLAND, Vol. XII, pp. 61–101.

NETTEMENT, ALFRED FRANÇOIS, a French journalist and author; born in Paris, July 22, 1805. He was educated at the College Rollin and early became identified with Parisian journalism. For several years he contributed to *L'Unnersue* and other journals. Later he established the newspaper, *L'Opinion Publique* and being a legitimist in politics gave ardent support to the grandson of Charles X. His journal was suppressed by Louis Philippe and he was thrown into prison. Upon his release he resumed his editorial labors but soon devoted his talents to authorship, becoming favorably known as a historian. He wrote *History of the Revolution of July, 1830* (1833); *Marie Therese of France* (1842); *Criticisms from the French Press* (1844); *The French Revolution* (1848); *History of French Literature under the Reign of Louis Philippe* (1852); *History of French Literature before the Restoration* (1854); *Souvenirs of the Restoration* (1858); *History of the Restoration* (1860), and other historical works. The last work was published in eight volumes. He died in Paris, November 15, 1869. W.M.C.

NETTLEWORTS, the nettle family. See NETTLE, Vol. XVII, p. 369.

NEUENDORF, ADOLPH, musical conductor and musician. He was born in Hamburg, June 13, 1843, and came to New York in 1855, where he studied the violin and piano. In 1859 he made his first appearance at a concert, and was subsequently engaged as the conductor of German opera in New York. He introduced the tenor Wachtel, Madame Eugenie Pappenheim, and Hofman, the boy pianist, to the American public. In 1877 he produced Wagner's *Walkure* for the first time, and as conductor of the Juch-English Opera Company created a Wagner craze throughout the country. He died Dec. 4, 1897. W.R.B.

NEUKOMM, SIGISMUND, a German composer; born at Salzburg, July 10, 1778; a pupil of Michael and Joseph Haydn, in 1793 organist of the Vienna University. Since 1804 he traveled about, and died at Paris, April 3, 1858. His works include the operas *Alexander am Indus; Melodramatic Music to Schiller's Braut of Messina;* a *Tedeum;* a *Requiem; Phantasies for Orchestra;* the oratorio, *Christ's Entombment, Resurrection and Ascension;* the cantatas *Easter* and *Pentecost.* G.A.S.

NEURINE. See NITROGEN, Vol. XVII, p. 533.

NEURITIS, an inflammation of the nerves. Nerve-fibers consist of a fibrous cylindrical sheath, within which is a semi-fluid substance, the medullary substance, surrounding an axis-cylinder, the nerve proper. When the fibrous sheath is inflamed it is congested and swollen, and presses more or less upon the contained tissues. When the medullary substance is inflamed it loses its homogeneous structure and divides into segments, globules or granules. When the axis-cylinder is inflamed its continuity is broken, it becomes granular, and finally disappears. A possible result of neuritis is the complete replacement of nerve-fibers by fibrous tissue. Inflammation of the nerve-cells and nerve-centers is more serious in its character, resulting in degeneration and destruction of nerve-tissue, loss of function, etc. The symptoms of neuritis are more or less fever, pain, with impairment of sensation, and localized paralysis, according as sensory or motor nerves are affected. The causes of neuritis may be exposure to cold, wounds or bruises, the extension of disease from adjacent parts, etc. The bacilli of diphtheria, scarlet-fever, typhoid-fever and other zymotic diseases may set up the inflammation, as may also certain poisons, as alcohol, the salts of lead, mercury, etc. The treatment is indicated by the causes, which are safely determined only by the physician.

NEUROPTERA, an order of insects of uncertain limits. In the order many authors include a large heterogeneous assemblage of insects with gauzy wings, having numerous longitudinal and cross veins. Some authors restrict the order to the hellgrammites, ant-lions and related genera. See INSECTS, Vol. XIII, pp. 155–158.

NEUROSES. See SKIN DISEASES, Vol. XXII, p. 131.

NEUSIEDLER SEE, a lake of HUNGARY, Vol. XII, p. 376.

NEUTRALITY. See DECLARATION OF PARIS, Vol. VII, pp. 20–21; also INTERNATIONAL LAW, Vol. XIII, pp. 201, 202.

NEUVILLE, ALPHONSE MARIE DE, a French artist, the most popular of the later school of French painters of battle-scenes; born in St. Omer, May 31, 1836. After studying under Delacroix, he painted a series of successful pictures illustrative of French exploits in the Crimean War, Italy and Mexico. Then came the war with Germany. Neuville fought in the ranks and learned something of real warfare from actual experience. This knowledge imparted additional power to his works depicting incidents of that war. He also chose the attack at Rorke's Drift and that at Tel-el-Kebir as subjects for pictures. Several of his works, including the celebrated *Attack at Dawn*, are in the Walters Gallery, Baltimore. Neuville excelled also as an illustrator of books, his best work in this line being done for Guizot's *Histoire de France.* Died in Paris, May 20, 1885.

NEVADA is 110,700 sq. miles in area, and had a population in 1890 of 45,761; that of 1900 was 42,335, a loss of 3,426, or 7.51 per cent. No other state in the Union showed a decrease in population in 1900, and not one made such an exhibit in

1890. The rank in population in the year last named was 43; in 1901 Nevada had fallen to 49, or last among all the states and territories. Almost the entire loss of inhabitants fell upon the rural portions of the state, their decrease in population being 13,085. The one city (Virginia City) to have a population of 8,500 or more in 1890 had in 1900 only 2,695; Carson City also lost, though Reno gained in population. The last census showed 134 negroes, a loss of 108 since 1890; there were 1,352 Chinese; the civilized Indians

STATE SEAL OF NEVADA.

numbered 3,551 and the Japanese 228. The native-born population constituted 75.86 per cent of the whole, and the density of population was 0.4 to the square mile, a decrease of 7.5 from that of 1890.

Nevada has a large amount of arable land that, with the aid of irrigation, produces excellent crops, but up to 1896 the development of the state had not been such as to make a showing of the resources of the agricultural portions. Much of the land on the mountain-slopes and in the valleys furnishes, without irrigation, pasturage that is not excelled in the Pacific coast region. The census reports of 1900 show 31,075 acres devoted to the cereals, more than one-half of which was cultivated in wheat. Of this grain there was produced 450,812 bushels, which was valued at $263,351. Barley came next in the quantity raised, the amount being approximately 224,000 bushels; oats ranking next, with a little in excess of 151,000 bushels. In 1900 there were 2,184 farms, and although this was an increase in the number as compared with 1890, the number of acres of improved land has decreased considerably, being only 572,946. The total valuation of lands, fences, buildings, farm implements and machinery, and live-stock was $28,673,835, an increase of more than 53 per cent during the decade immediately preceding. The number of horses was 80,295; the number of neat cattle, 385,192, including 13,606 milch cows; the number of swine, 15,174; and the number of sheep, 568,251, from which 4,842,500 pounds of wool was shorn. The total land area is 70,233,600 acres, of which 2,565,647 acres, or 3.7 per cent are included in farms.

Nevada has been a mineral-producing state from its earliest history. The census reports of 1890 give the total value of all mineral products of the state for the preceding year as $10,143,874. While gold is not abundant as a metal, some of the argentiferous ores contain a large amount in combination. The percentage varies from 20 per cent in some ores to 50 per cent in others. Silver is the staple mineral product of the state. The number of ounces produced in 1900 was 1,300,000, of the value of $750,150. The gold product for the same year amounted to 113,681 fine ounces, of the value of $2,350,000. The total yield of gold and silver of the state for 1892 was $3,492,416, but in 1893 the aggregate value was almost one million dollars less. Estimates of the amount of these two metals produced from the commencement of mining operations place the value at $750,381,515. The depression affecting business affairs in 1893 seriously interfered with the working of the mines, and only such as were thoroughly opened up and in working order were enabled to run at a profit; and the three years next succeeding were very similar. Iron-ore of an almost pure quality has been found, which has been shipped to San Francisco for manufacture into steel since 1894. By reason of its purity and the ease with which it can be mined and shipped, this deposit gives great profit to the miners and shippers and has added a new source of wealth to the state. In the western portion, bituminous coal of excellent quality was discovered in 1894, and is so located as to be easily shipped to consuming points throughout the western part of Nevada and eastern California. Large fields of borax deposits exist in Washoe County, about one hundred miles north of Reno. The borax is in an almost pure state, and operations to place it on the market in commercial form were commenced in 1894. The state is rich in mineral springs. One near Carson City has a flow of 4,000 gallons an hour, with the temperature 120° F. The mineral constituents are soda, borax, iron, magnesia and arsenic. In different sections there are 70 alkali springs, 15 mineral springs, 8 thermal, 22 warm, besides numerous springs impregnated with soda, sulphur and other mineral substances.

In 1900 Nevada had 228 specified manufacturing industries, in which capital to the amount of $1,472,784 was invested; 601 persons were employed, to whom $416,732 were paid in wages; and products of the value of $1,643,675 were turned out. The leading lines of industry were car and general shop construction ($295,985), chemicals ($20,950), and printing and publishing newspapers and periodicals ($111,052). No factories were reported from four counties of the state, the remaining ten counties all having one or more industrial establishments.

At the beginning of 1901 the state had a debt of $642,600, as a partial set-off against which there was about $172,900 in the treasury. The school fund holds a bond of the state for $380,000, bearing five per cent annual interest. This bond is irredeemable, and cannot be properly classed as a state debt. The disbursements for 1900 were $533,403; the amount remaining in the treasury Jan. 1, 1901, was $246,159. The revenue in 1900 was $510,609, showing a deficit of $22,794. Of the money on hand, there was $73,337 belonging to the school funds, and about $20,000 in the different university funds. In 1898 the ordinary revenue was $380,447; the ordinary expenditure, $403,691. The assessment upon which the revenues mentioned were raised

showed the value of the real estate to be $18,029,819; personal, $8,148,241: making a total of $26,178,060. The assessed valuation has never exceeded one third of the actual valuation, which would place the aggregate wealth of the state at nearly $80,000,000, a sum almost $100,000,000 less than the estimate given by the census bureau of Washington, District of Columbia, previous to the financial depreciation that came to the country generally in 1893.

STATE CAPITOL, CARSON CITY.

The school population of 1898 was near 10,000, of whom over 7,000 were enrolled, and more than 66 per cent of the enrollment attended the 300 schools of the state. The leading institution of higher education in Nevada is the State University (q.v., in these Supplements). This institution was partially destroyed by fire in November, 1895, but was soon rebuilt. The total state expenditures for the public schools and the State University for the biennial period ending with the beginning of 1898 amounted to $249,815. The amount of bonds with accrued interest and cash held by the state in trust for the educational funds was, in 1898, $1,290,999. In addition, over 400,000 acres of land belonging to the common-school fund of the state remained unsold.

The state penal, charitable and reformatory institutions include the following: State prison, average number of inmates during 1895 88, cost of maintenance for the year $62,994; the state insane asylum, average number of patients 187, cost of maintenance for the year $70,908; state orphans' home, average number of children in attendance 80, expenses of maintenance for the year $27,975. The deaf, dumb and blind are maintained at the California institution for these unfortunates, the cost to the state of Nevada being $300 annually for each person.

The National Guard of Nevada consisted, from 1893 to 1896, of seven companies of infantry and a battery of light artillery attached to infantry. This force included 47 officers and 438 enlisted men, the seven companies being all embraced in one regiment. The appropriation for the annual maintenance of the Guard in 1895 was about $6,300, supplemented by a Federal appropriation which amounted to $2,500.

There were 920 miles of railway lines in Nevada in 1900, the Central Pacific alone constituting about one half of this mileage. The total valuation of the different lines was given at $8,825,000, the estimated cost of building, however, having been fully double this amount.

Nevada had in 1896, 64 church organizations, 41 edifices, a membership of 5,877, which constituted 12.84 per cent of the population. Nine denominations were represented in the census, of which the most prominent in point of numbers were the Adventists, 4 bodies; Roman Catholics, 20; Latter-Day Saints, 20; all Methodists, 12; all Presbyterians, 8; and Protestant Episcopals, 9.

Jan. 1, 1899, there were 33 papers of all kinds published in Nevada. There were one or more papers published in 13 of the 14 counties of the state; in 19 of the cities, towns, and villages, and in 13 of the county seats; 10 of the papers were daily, 1 triweekly, 2 semiweekly, and 20 weekly.

The following is a list of the principal cities and towns of Nevada, with the population as given in the census reports of 1900: Virginia City, 2,695; Carson City, 2,100; Reno, 4,500; Eureka, 785; Austin, 702; Tuscarora, 669; Lovelock, 1,204; Elko, 849; Gold Hill, 872, and Winnemucca, 1,110.

The following is a list of the governors of Nevada from 1864, the date of the admission of the state into the Union, with their terms of office:

James W. Nye	1864–	Frank Bell	1890–91
Henry G. Blasdel	1864–71	Roswell K. Colcord	1891–95
Luther R. Bradley	1871–79	John E. Jones	1895–96
John H. Kinkead	1879–83	Reinhold Sadler	1896–1903
Jewett W. Adams	1883–87	John Sparks	1903–
Christopher C. Stevenson	1887–90		

See NEVADA, Vol. XVII, pp. 376–78.

NEVADA, a city and the county seat of Story County, Iowa, in the central part of the state. It stands on Indian Creek, thirty miles north by east from Des Moines, and is reached by the Chicago and Northwestern railroad. It is in an agricultural country, and has some manufactures pertaining to that industry. Its population in 1900 was 2,472. W.F.J.

NEVADA, a city of Vernon County, Missouri, in the southern part of the western border of the state. It lies ninety miles south of Kansas City, in a rich stock-raising and agricultural country, among the southwestern tributaries of the Osage River, and is reached by the Missouri, Kansas and Texas and the Missouri Pacific railroads. It is the seat of some manufacturing establishments, of a state hospital for the insane, and of several educational institutions of high rank. There are coal mines in the vicinity. Its population in 1900 was 7,461. W.F.J.

NEVADA CITY, a city and the capital of Nevada County, north-central California, 128

miles N. E. of San Francisco, on a branch road connecting with the Central Pacific Ry.; has rich gold mines in the vicinity, and is a center of supply for the neighboring mining towns, and for an agricultural district. Population 1900, 3,250.

NÉVÉ. See GLACIER, Vol. X, 559, 560.

NEW ALBANY, an important industrial city and the county seat of Floyd County, Indiana. It lies on the Ohio River, five miles west of Louisville, Kentucky, has many manufacturing establishments, and enjoys an extensive commerce. It is reached by the Louisville, New Albany and Chicago, the Louisville, Evansville and St. Louis, the Ohio and Mississippi, and the Pittsburg, Cincinnati, Chicago and St. Louis railroads. Its population in 1900 was 20,628. W.F.J.

NEWARK, a village of Newcastle County, northwestern Delaware, 11 miles S.W. of Wilmington, on the Baltimore and Ohio railroad. Delaware College (non-sectarian) was founded here in 1870, and in 1896 had 14 instructors, 78 students, and a library containing 6,736 volumes. Newark has a foundry, a paper-mill, a woolen-mill and two carriage-shops. Population 1890, 1,191; 1900, 1,213.

NEWARK, the capital of Essex County, northeastern New Jersey. The principal railroads entering the city are the Pennsylvania, the Delaware, Lackawanna and Western, the Erie and the Central of New Jersey. There are 63 miles of paved streets and over twenty miles of trolley lines. Great improvements have been made of recent years for the navigation of the Passaic river. The United States census for 1900 gives the following statistics of manufactures for Newark: Number of industries, 3,339; capital invested, $103,191,403; wages paid annually, $29,534,311; total value of products, $126,954,049; average number of employees, 50,059. Newark has nine national banks, one state bank with a capital of $100,000, and five savings banks. Two life-insurance companies, the Mutual Benefit and Prudential of America, have their central offices here. There are upward of one hundred churches, embracing almost every denomination, the Presbyterians heading the list with 23 and followed closely by the Methodists with 22. Charitable and benevolent institutions are quite numerous; principal among them are an insane asylum, four hospitals, an eye-and-ear infirmary, the Female Charitable Society, the Foster Home for Children, the orphan asylum, and the City Home for the reform of juvenile delinquents. Chief among the new public buildings which have been erected in recent years is the Prudential Life Insurance Company building, situated at the corner of Broad and Bank streets, a thirteen-story structure constructed of gray stone, fire-proof, and equipped with the latest devices for convenience. The new public library is also a fine structure. Population 1890, 181,830; 1900, 246,070. See also NEWARK, Vol. XVII, p. 379.

NEWARK, a village of Wayne County, New York, in the northwestern part of the state. It lies 30 miles east by south from Rochester, in an agricultural region largely devoted to hop-growing and dairying. It is the seat of a state asylum for feeble-minded women. It is reached by the Erie canal, and the New York Central and Hudson River, the West Shore and the North Central railroads. Its population in 1900 was 4,578. W.F.J.

NEWARK, Ohio, a city and the county seat of Licking County, in the central part of the state. It is on the Licking River, and the Pittsburg, Cincinnati, Chicago and St. Louis and the Baltimore and Ohio railroads. Its chief industries are large car shops. Its population in 1900 was 18,157. See Vol. XVII, p. 380. W.F.J.

NEWAYGO, a village and the capital of Newaygo County, western lower Michigan, 30 miles N.N.W. of Grand Rapids, on the Chicago and West Michigan railroad; has extensive water-power, and manufactories of furniture, lumber, pails and bricks. Population, 1890, 1,330; 1900, 1,172.

NEW BEDFORD, a city and one of the capitals of Bristol County, in the state of Massachusetts, on the Old Colony and the New York, New Haven and Hartford railroads; has steamers to Cottage City, distance 32 miles, and freight steamers to New York; electric street-railways to Fall River and Fairhaven; stages to Dartmouth, 7 miles, to Little Compton, Rhode Island, 20 miles; to Mattapoisett, 6 miles; to Marion, 12 miles; and to Westport Point, 16 miles. In 1900, in the manufacture of cotton goods it stood second in the United States; the largest cotton manufactory in the world, called the Wamsutta mills, is here. The number of employees in the 15 cotton factories is 12,426. New Bedford also manufactures soap, cordage, carriages, leather and glass. The public library has 100,000 volumes. Population 1890, 40,733; 1900, 62,442. See NEW BEDFORD, Vol. XVII, p. 381.

NEWBERG, a postoffice of Yamhill County, northwest Oregon, 20 miles S.W. of Portland; known only as having Pacific College (Friends), a co-educational institution organized in 1890, and had in 1901 8 instructors, 150 pupils and a library containing 600 volumes.

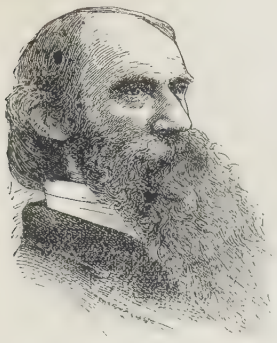
NEW BERLIN, a station in Berks County, central Pennsylvania, nine miles N. of Pottstown; the seat of Central Pennsylvania College (Evangelical), a co-educational institution founded in 1855, which had in 1901 10 instructors, 100 pupils and a library containing 5,330 volumes.

NEWBERN, a city and the capital of Craven County, North Carolina. Population 1900, 9,090. See NEW BERNE, Vol. XVII, p. 381.

NEWBERRY, a village and the capital of Newberry County, northwestern South Carolina, 47 miles W.N.W. of Columbia, on the Columbia, Newberry and Laurens railroad. The seat of Newberry College (Lutheran), organized in 1857, which had in 1901 8 instructors, 165 pupils, and a library containing 9,000 volumes. Good granite is found in the vicinity. It is an important market for cotton. Population 1900, 4,607.

NEWBERRY, JOHN STRONG, scientist, was

born at Windsor, Conn., on December 22, 1822, and was graduated from the Western Reserve College, Ohio, in 1846, and from the Cleveland Medical School in 1848. He studied in Europe, and in 1851 published his first scientific essay, on the fossil fishes of Italy. He practiced medicine for a time in Cleveland, but in 1855 gave up that work for scientific research. He was geologist to a government party that explored the country between San Francisco and the Columbia River, in 1855, and of another, on the Colorado River, in 1857–58. The latter expedition went up the Colorado in a boat from the Gulf of California to the Grand Cañon, and spent some time with the Pueblo Indians. In 1859 he accompanied an expedition in Colorado, Utah, Arizona and New Mexico, and made some important observations of the remains of the cliff dwelling Indians. During the Civil War he was connected with the Sanitary Commission and expended more than $800,000, distributed supplies worth $5,000,000, recorded the names of 850,000 soldiers, and gave food and shelter to 1,000,000 soldiers. After the war he was connected with the Smithsonian Institution, and with the Columbian University in Washington. In 1866 he was called to the newly-created chair of geology and palæontology in the Columbia College School of Mines, New York, and filled it until the latter part of 1890. While in that place he collected more than 100,000 specimens, now in the Museum of the School of Mines. In 1869 he was director of the Ohio Geological Survey, and between that date and 1882 published voluminous reports and an atlas. He also worked with the Illinois Survey and the New Jersey Survey, and was president of the American Association for the Advancement of Science in 1867. He died at New Haven, Conn., on Dec. 7, 1892.



PROF. J. S. NEWBERRY.

W. F. J.

NEWBERRY, Walter Loomis, an American philanthropist; born in East Windsor, Connecticut, Sept. 18, 1804. In 1833 he removed to Chicago, where he was very successful as a merchant and banker. By his will he left over $2,000,000 to found the library in Chicago known by his name. The building, facing Washington Common, is one of the architectural features of the city. The library is the best reference library in the West, some of its departments containing rare collections, as, for example, its recently acquired Chinese collection. He died Nov. 6, 1868.

NEW BLOOMFIELD, a borough and the capital of Perry County, southeastern Pennsylvania, 20 miles N.W. of Harrisburg, on the Perry County railroad; has an academy, a foundry and a tannery. The scenery in the vicinity is very beautiful. Population 1890, 737; 1900, 772.

NEW BRAUNFELS, a village, the capital of Comal Co., Texas, 41 miles S.S.W. of Austin; has an academy, a woolen-mill, and an oil-mill. Pop. 1890, 1,608; 1900, 2,099.

NEW BRIGHTON, formerly a village of Richmond County, Staten Island, New York, now a part of New York city, borough of Richmond. It lies at the northern end of Staten Island, and on the southern shore of New York bay, and is reached from the borough of Manhattan by ferry. It has borax refineries and other industries.

W. F. J.

NEW BRIGHTON, a borough in Beaver Co., Pa., on the Beaver River, 28 miles N.W. of Pittsburg; has good water power, flour and planing mills, potteries, brickyards, glass-works, and several factories. Pop., 1900, 6,820.

NEW BRITAIN, a city of Hartford County, Connecticut, is a manufacturing center, especially of electrical supplies, and in 1900 had a population of 25,998. See also in Vol. XVII, p. 381.

W. F. J.

NEW BRUNSWICK. (See Vol. XVII, pp. 382–84.) This Canadian province has the following later history: Its population in 1901 was 331,120. 10,000 greater than in the previous decennial census. The various Protestant bodies include about two-thirds of the population, the Roman Catholics one-third. The Indian population was, in 1894, 1,618, many of whom engage in farming and lumbering pursuits, and a moiety of whom attend schools. These belong to the Micmac and Malicite tribes. Large tracts of the province are still heavily wooded, that portion lying adjacent to the province of Quebec being hilly and rugged. The province is well supplied with railways, the Intercolonial traversing it from north to south, and the Canadian Pacific, the Canada Eastern, the Short Line and other roads traversing it laterally.

Lumbering is the chief industry of the province, the area of forest and woodland in 1893 being nearly 15,000 square miles. In the same year there were 5,673 square miles under lease to lumbermen, yielding revenue, for the year, $106,507. The entire timber cut in 1899, in the province, was considerably over 100,000,000 feet, chiefly pine, spruce, hemlock and cedar. Fisheries are another source of wealth in New Brunswick, the value of the catch for 1899 being nearly $4,119,891. The number of men engaged in the industry for the same year was, on board vessels, 885, and in boats, 1,027. The value placed, in 1899, on the equipment, including vessels, boats, nets, fishhouses, etc., was $2,181,888. The value of the fish exported for the year was $731,392. The value of the forest products exported exceeded $5,500,000. In 1900 the province had vessels engaged in the coasting-trade of over 1,573,000 gross tonnage.

The live-stock owned in the province, in the year 1891, included horned cattle, 202,439; horses, 59,586; sheep, 181,110; swine, 51,093. The figures representing the horned cattle show a decrease since the last census; the other live-stock show a slight increase. New Brunswick

possesses only about half the number of industrial establishments possessed by her sister province of Nova Scotia, with about two-thirds the gross capital, there being 5,429 in 1891, including five cotton-mills, two rolling-mills and several foundries, with nearly $16,000,000 working-capital. The value of the articles manufactured for the same year was close upon $24,000,000. The value of the total exports of the province in the year 1900 amounted to a little over $14,000,000, and that of imports $6,673,709, $2,000,000 worth being free goods. The gross revenue for the year amounted to $758,989, or $2.27 per head of the population. Of this sum, $483,492 was derived from the Dominion subsidy, the remainder accruing from fishing-rights, fees and crown timber leases. The debt of the province was, in 1900, $3,449,966, against assets of only $598,880.

New Brunswick has now but one legislative chamber, the legislative council, or upper house, being abolished in 1892. There are 45 members, representing the population of the 16 counties, including an executive of 7 members, 2 of whom are without office. A lieutenant-governor is officially the head of the government, the seat of which is Fredericton. The province is represented in the Federal Parliament at Ottawa by 10 members in the Senate and by 14 members in the Commons. Education is represented by the University of Brunswick and its collegiate school, maintained by the province. There are two other colleges under the control of denominations, besides a normal school for the equipment of teachers, supported by government. There are, also, 14 grammar schools, with an average attendance of 500, with 68 teachers and assistants. In 1900 there were 1,771 public schools in operation, with an average attendance of 37,529, and 1,856 teachers. The total amount raised by the province for the purposes of education was, in 1900, $605,485, made up as follows: Legislative grant, $170,581; county fund appropriation, $94,430; and district assessment, $181,177. Pop., 1901, of Fredericton, the capital, 7,117.

NEW BRUNSWICK, a city and the county seat of Middlesex County, New Jersey, in the central part of the state. It is on the Raritan River, is reached by the Pennsylvania railroad and the Raritan and Delaware canal, and is one of the chief manufacturing centers of the state. Its population in 1900 was 20,006. See also in Vol. XVII, p. 384. W.F.J.

NEWBURG, an important city and the county seat of Orange County, New York, in the eastern part of the state, is reached by the West Shore and the Erie railroads. It contains numerous industrial establishments, several public libraries, and three asylums. Its population in 1900 was 24,943. See Vol. XVII, p. 384. W.F.J.

NEWBURYPORT, a city and the county seat of Essex County, Massachusetts, in the northeastern corner of the state. It lies on the Merrimac River, near the Atlantic Ocean, and is an important shipping and fishing center. It contains a fine public library and a museum. It is reached by the Boston and Maine railroad, and had in 1900 a population of 14,478. See Vol. XVII, p. 385. W.F.J.

NEW CANAAN, a town and borough of Fairfield County, Connecticut, in the southwestern part of the state. It is seven miles from Long Island Sound, on Five Mile River, is reached by a branch of the New York, New Haven and Hartford railroad, and had in 1900 a population of 2,968 in the town and 1,304 in the borough. W.F.J.

NEWCASTLE, a city of Newcastle County, Delaware, in the northern part of that state. It lies on the Delaware River, five miles south of Wilmington and thirty miles southwest of Philadelphia, and is reached by the Baltimore and Ohio railroad. It is an important shipping point for the fruit, vegetables and other products of the fertile farming land adjacent to it, and is a port of entry. It was formerly the county seat. Its population in 1900 was 3,380. W.F.J.

NEWCASTLE, a town and the capital of Henry County, eastern-central Indiana, 26 miles W.N.W. of Richmond, on Blue River, and on the Cleveland, Cincinnati, Chicago and St. Louis, the Lake Erie and Western and the Pittsburg, Cincinnati, Chicago and St. Louis railroads; in an agricultural region, and contains important manufactures of furniture, carriages, brick and lumber. Population, 1890, 2,697; 1900, 3,406.

NEWCASTLE, a village of Northumberland County, New Brunswick, Canada, on the left bank of the Miramichi River, 90 miles N. N. E of Fredericton, on the Intercolonial railroad. It is a port of entry; has a trade in lumber and fish; a shipyard and tannery are here. Pop., 1901, 2,507.

NEW CASTLE, Pennsylvania, a city and the county seat of Lawrence County. It is on the Shenango River, forty-two miles from Pittsburg, has extensive coal and iron industries, is reached by the Pennsylvania, the Erie and the Pittsburg and Western railroads, and had in 1900 a population of 28,339. W.F.J.

NEW CONCORD, a village of Muskingum County, southeastern Ohio, eight miles W. of Cambridge, on the Baltimore and Ohio railroad; contains Muskingum College (United Presbyterian), founded in 1837, a co-educational institution, which had, in 1901, 13 instructors, 215 pupils and a library containing 3,650 volumes. Population, 1900, 675.

PROF. SIMON NEWCOMB.

NEWCOMB, Simon, an American astronomer and mathematician; born in Wallace, Nova Scotia, March 12, 1835. He studied at Harvard and in 1860 was graduated from the Lawrence Scientific School. In 1861 he was appointed professor of mathematics in the United States Navy, and in 1877 became senior professor and director of the *Nautical*

Almanac. In 1871 he was secretary of the commission created by Congress to arrange for a thorough scientific observation of the transit of Venus on December 9, 1874. In 1894 he became professor of mathematics at Johns Hopkins University. He has edited for many years *The American Journal of Mathematics* and has published *Popular Astronomy* (1878); *Geometry* (1880); *Calculus* (1884), and *His Wisdom the Defender* (1900). He wrote the articles ASTRONOMY; OBSERVATORIES, and TELESCOPES in these Supplements. In 1897 he retired for age from the United States naval service and devoted himself subsequently to study and literature. W.M.C.

NEW CUMBERLAND, a village of Hancock County, southwestern West Virginia, 32 miles N. of Wheeling, on the Pittsburg, Cincinnati, Chicago and St. Louis railroad, and on the Ohio River; has gas-wells and extensive manufactures of fire-brick. Population, 1890, 1,400.

NEW DECATUR, a town of Morgan County, northern Alabama, 2 miles S. of Decatur and 25 miles S. of Athens, on the Louisville and Nashville railroad; a suburb of Decatur, and has many fine residences. Pop. 1890, 3,565; 1900, 4,437.

NEWELL, ROBERT HENRY, an American journalist and author; born in New York, Dec. 13, 1836. He received an academic education and entered on a journalistic career. He was literary editor on the *New York Mercury*, 1858–62; next edited the "social study" column of the *New York World;* and later became the editor of *Hearth and Home*, a weekly magazine. He was perhaps best known as "Orpheus C. Kerr" (a play upon the term "office-seeker"), the writer of four volumes of humorous letters on the Civil war and Reconstruction, entitled *The Orpheus C. Kerr Papers*, and published between 1862 and 1868. Among his published books are: *The Cloven Foot* (1870); *Versatilities*, poems (1871); *The Walking Doll* (1872); *Studies in Stanzas* (1882); *There Was Once a Man* (1884). He died in Brooklyn, N. Y., July 12, 1901. E.E.T.

NEW ENGLAND, a collective name given to the six Eastern states of the United States—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut—embracing an area of 65,000 square miles. The joint population in 1900 was 5,591,952. This is more than one thirteenth of the entire population of the republic, while the area of New England is less than one fiftieth of the total area of the United States.

NEWFOUNDLAND, a British colony; for a general article upon which, see Vol. XVII, pp. 391–395. Area 42,200 sq. miles; pop. 1901, 224,249.

There were, in 1896, 18 electoral districts, returning 36 members. The governor receives a (reduced) salary of $7,000; each member of the legislative council receives $120 per session, and members of the House of Assembly $200 to $300, according as they are resident in or out of St. John's. The 18 electoral districts are arranged so that 7 of them return three members, 4 two members, and 7 one each.

Of the population (220,249 in 1901), 72,650 belong to the Church of England, 76,259 are Roman Catholics, 60,812 are Methodists, 1,449 are Presbyterians, and 4,795 belong to other denominations. The total number of aided schools in 1891 was 547, with 32,339 pupils, the government aid being $129,200.

The revenue for 1900 was $2,242,048, and the expenditure $1,983,445. The total exports in the same year amounted to $8,627,575, and the imports to $7,497,145. The chief export is dried cod, the value of which was $5,453,538; the other exports being cod and seal oil, sealskins, preserved lobsters, iron pyrites, copper ores, and regulus. The leading imports consist of flour and woolens, cottons and canvas, etc. The total tonnage of vessels entering and clearing in 1899 was 1,241,490, of which 1,645,572 was British.

Fishing is the principal occupation, the value of the annual catch being over $6,000,000. Asbestos is mined on the west coast; copper, iron pyrites, lead and silver are obtained, and an extensive coal-field has been discovered near Grand Lake. Shipbuilding and lumbering are increasing.

There were 86 miles of railroad opened in 1887 from St. John's to Harbor Grace; and in 1888 an additional 25 miles, being a branch line to Placentia; 200 miles to Exploits Bay and Hall's Bay were later completed, and a further extension to the west coast by the Bay of Islands, St. George's Bay, and Port Basque Bay was finished in 1897, making a total of 633 miles, the cost of which was estimated at $16,000 per mile.

There is a regular fortnightly mail-steamer service (except from February to April) around the island, and with the American continent, Prince Edward Island, and also Liverpool. The landing-place of the Transatlantic cables is at Heart's Content Harbor, an inlet of Trinity Bay. The American cable starts from Placentia.

A great impetus was given to agriculture by legislation. In 1891 there were 64,496 acres under cultivation, the chief products being potatoes, turnips and other root crops, and hay, barley and oats. The number of live-stock has been doubled within the last twenty years.

The "shore fishery" has been a continued source of trouble in the colony. In 1887 a petition was sent to the imperial government in regard to the encroachments of the French. A bill dealing with the matter was introduced into Parliament, but was rejected. The matter then became the subject of diplomatic action between Great Britain and France. The French fishermen, being aided by a bounty, were able to undersell the Newfoundlanders in foreign markets, so, to counteract this, an act was passed by the colonial government to prevent the sale of bait to French fishermen. This act was vetoed by the imperial government, but was eventually allowed, on the earnest solicitation of the colonists. The result was that within two years the fish-product was increased twenty per cent through the operation of this law. Matters looked so serious in 1889 that the British and French governments

entered into a temporary *modus vivendi* in the early part of 1890, with the view of settling the whole dispute by treaty. This action gave great offense to the colony. In 1891 the commander of the British war-ships on the coast attempted to enforce the *modus vivendi* by closing down some lobster factories, but upon an appeal to the courts it was found that the naval commander had exceeded his authority. This led to the introduction into the House of Lords of a measure providing such authority, whereupon the colonists sent delegates to London, to be heard at the bar of the Upper House. The occasion of their making their appeal was historic, and the audience was brilliant. The claims of the colonists were allowed. The obnoxious measure was withdrawn on the condition that the colonial legislature would recognize the *modus vivendi* for a limited time. Since then the matter has remained unsettled, the *modus* being renewed from time to time and arbitration delayed. The shore-fishing, however, is now of little importance to France, there being only seven French fishing-vessels engaged in the industry in 1889.

The main operations of the French fishermen are on the banks, and are carried on from the Isles of St. Pierre and Miquelon, at the mouth of Fortune Bay, on the south coast, these islands being ceded to France in 1793, by the Treaty of Paris. A fleet of more than two hundred vessels, each of from one hundred to four hundred tons, sails from France annually, in the spring. The annual value of the fishing on the banks amounts to over two millions of dollars. In 1871 United States fishermen were, by treaty, granted rights of fishing in Fortune Bay (q.v., in these Supplements).

In 1892 St. John's, the capital (population 1901, 31,142) was swept by a disastrous fire, which broke out July 8th, the amount of damage being estimated at from $15,000,000 to $20,000,000. Relief was immediately promised and secured, the Mansion House fund being promptly handed over to the sufferers. Building commenced soon after the fire and great progress made in putting the new portion of the city in a much more improved state than before.

The general election of 1893 resulted in the return to power of Sir William Whiteway, but wholesale bribery was alleged against 17 of his colleagues. The seats were contested, proceedings taken in the courts and two members were unseated. Then the premier recommended the dissolution of the legislature, but this was refused by the governor. The proceedings against the others were then taken, and all except two were unseated, the number including Sir W. Whiteway himself and the ex-speaker. The former resigned, but after a stormy political year the Whiteway party was again in the majority, and in December the ministry of A. F. Goodridge resigned, being succeeded by that of D. J. Green, who introduced a bill to relieve the impositions, on account of the bribery trials, on Sir. W. Whiteway and his colleagues. Then, in January, Mr. Green resigned and Sir Wm. Whiteway again took office. This occurred in 1895, but two years later Sir William failed of re-election. He took part, however, in Queen Victoria's Diamond Jubilee in the latter year, and on the occasion was sworn of the Privy Council. In 1880 he had been created a K. C. M. G. The new Premier was the Hon. Robert Bond, who had been Colonial Secretary, a delegate to Ottawa to confer on the proposed terms of Union with Canada, and to Washington to confer on the subject of reciprocity with the United States. In the elections of Nov. 1900, Mr. Bond's administration was sustained at the polls. The contest was, however, a keen one, the Opposition, under Mr. Morine, making a hard fight of it. Mr. Bond's return was mainly brought about by public opposition to the contract entered into in 1897 by the government of Sir Wm. Whiteway with a contractor of some eminence, Mr. R. G. Reid. This contract, it was held, made undue concessions to Mr. Reid, though designed eventually to benefit the colony by the magnitude of its development operations.

During the ministry of Mr. Green the colony had encountered a financial panic by the failure of the Commercial Bank of St. John's, the Union Bank of Newfoundland, and the Savings Bank. The cause of this unsound condition of affairs was the credit or "truck" system, under which the fishery business had for generations been conducted. A legislative commission found that the Union Bank was solvent, but that the Commercial was hopelessly insolvent. A bill was carried by which the government guaranteed, in the case of the Union Bank, eighty cents, and in the case of the Commercial, twenty cents, on the dollar of the total note issue. The total public debt in 1900 was $17,376,774, or more than $400 for every family in the colony. Much of the debt was incurred in connection with the railway extensions.

Under these embarrassing conditions the negotiations for joining the Dominion, the measures for effecting which have been well considered, have been delayed or abandoned.

NEWGATE, a celebrated London prison, stands at the western extremity of Newgate Street, opposite the Old Bailey. It is now used for the temporary detention of prisoners awaiting and during trial in the Central Criminal Court, in the vicinity, and also for criminals condemned to death, the death penalty (hanging) being there carried out. The exterior presents high, dark stone walls, without windows.

NEW GUINEA OR PAPUA. Great changes have occurred in the proprietary jurisdiction of the island. The half lying west of the 141st meridian has been assigned to the Netherlands. (See NETHERLANDS, in these Supplements.) The northern section of southeast New Guinea, comprising an estimated area of 72,000 square miles and a population of 110,000, was named Kaiser Wilhelm's Land, and was declared to be under a German protectorate in 1884. The present English territory in New Guinea starts from the northeast coast, on the 8th parallel of south lati-

tude, and follows it to its intersection with the 147th meridian; thence northwest to the intersection of the 5th degree of south latitude with the 144th degree of east longitude; thence west-northwest to the intersection of the 5th degree of south latitude and 141st degree of east longitude. The adjacent islands north of lat. 8° S. are German; those south of that latitude are English. The English territory has an estimated area of 90,540 square miles and a population of 350,000, with Port Moresby as the official center. For general article embracing the early history, see NEW GUINEA, Vol. XVII, pp. 396–399.

NEW HAMPSHIRE has an area of 9,305 square miles, of which 300 are water surface, leaving the

STATE SEAL OF NEW HAMPSHIRE.

land area 9,005 square miles, or 5,763,200 acres. In 1890 the population was 376,530; that of 1880 was 346,991, the gain being equal to an increase of 8.51 per cent. In 1900 the population was 411,588, an increase of 9.3 per cent. over the previous decade. The twelfth decennial census showed New Hampshire to have nine cities of 8,000 and upward in population, the smallest, Laconia City, having a population of 8,042, and the largest, Manchester, a population of 56,987. The latter city has exhibited a rapid growth in the past five decades, the increase in the last ten years being at the rate of 29.1 per cent. Berlin has also taken a great stride from 3,729 in 1890 to 8,886 in 1900. The other chief cities of the State are Concord, Dover, Franklin, Keene, Nashua, Portsmouth, Rochester, and Somersworth.

New Hampshire had, in 1899, 42,335 acres devoted to the cereals, the product in bushels having been 1,677,225. Of the total acreage devoted to the cereals, 38.61 per cent was in corn, 43.28 under oats, 8.02 under barley, 3.30 under wheat, 5.07 under buckwheat and 1.72 under rye. During the decade 1890–1900 the number of farms in New Hampshire increased from 29,151 at the former period to 29,324 at the latter. The improved lands in farms increased during the same period almost 600,000 acres, and the percentage of unimproved land in farms increased from 37.97 to 50.06. The total valuation of lands, buildings, fences, farm implements and machinery and live-stock was, in 1900, $85,842,096,—a gain of about $5,600,000 since 1890. The number of horses in 1900 was 54,866,—an increase from 52,458 in 1890; the total number of cattle increased from 222,888 to 226,792, the number of milch cows increased from 109,423 to 115,036, and the number of sheep decreased from 131,611 to 65,318.

In 1900, New Hampshire had 4,671 specified manufacturing industries, in which capital was invested to the amount of $100,929,661, persons to the number of 70,419 were employed, to whom wages to the amount of $27,620,247 were paid, and from which products aggregating $118,669,308 were turned out. Cotton goods led in value of product, the same being $22,998,249, followed by boots and shoes to the value of $23,405,558, and woolen goods $10,381,056. Other industries of importance were worsted goods, lumber and other mill products, hosiery and knit goods, leather (tanned and curried), flouring and grist mill products, foundry and machine-shop products and furniture (factory product).

The report of the state treasurer for the fiscal year ending May 31, 1898, showed the receipts for the year to have been $1,325,687, which, added to the balance on hand at the beginning of the year, made the amount in the treasury, June 1, 1898, $1,566,983. The disbursements were $1,152,468. The net indebtedness of the state, Jan. 1, 1898, amounted to $1,367,657. The largest items of revenue were state tax, $500,000; railroad tax, $136,603; insurance tax, $26,001. The total assessed value of property in the state on Jan. 1, 1899, was $276,118,255. The addition of railroad and other taxable property brought the aggregate up to $286,756,618, which was to continue as the basis of apportionment of the state taxes from 1895 to 1900.

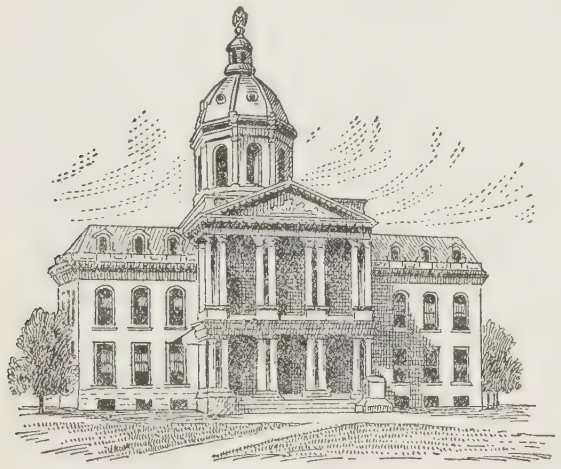
In 1900 the total railway mileage of New Hampshire was about 1,193 miles. The Mount Washington railway, running from the base to the summit of Mount Washington, a distance of 3.333 miles, is remarkable for its maximum grade of 1,980 feet to the mile and its extreme curve of 497 feet radius. The cost of construction, equipment and land made a total investment of $221,500. The gross earnings from operation for 1895 were $22,444, and the operating expenses $11,898, leaving a net income from operation of $10,545.

The number of financial institutions under the control of the board of bank commissioners on June 30, 1900, was as follows: Nine state banks, 55 national banks, 58 savings banks, 17 building and loan companies. The savings banks reported assets and liabilities amounting to $71,710,241; the total amount of deposits was $53,896,711; the surplus, $219,845. The number of open accounts was 163,870, while in the savings departments of the trust companies of the state the number of depositors was 7,050. The 55 national banks reported assets amounting to about 10 millions; with deposits amounting to $14,207,553, and reserve held of $4,574,996. The total assets of the building and loan associations, October 31, 1895, reached $1,592,010,—an increase for the year of $223,782. Their loans on real estate amounted to $1,472,522, and on shares to $34,740. The amount of loans paid during the year was $60,097, the dues received for this period were $139,247, the profits withdrawn were $19,428, shares returned were $41,528, and the profits on retired shares were $14,314.

The number of public schools in New Hampshire at the beginning of 1899 was 1,954, the average attendance of the year preceding having been 47,733. In addition, 7,425 pupils were reported as attending private-schools. The whole number of male teachers was 280, of female teachers 2,907; the average wages

of the former, $49.78 per month, and of the latter $27.36. The total annual expenditures in the maintenance of the public schools of the state is over $1,000,000.

At the opening of 1895 there were 402 patients in the State Asylum for the Insane. In November of that year there was opened for occupancy an addition to the asylum, intended for convalescents, which had been erected at a cost of about twenty thousand dollars. The Orphans' Home at Franklin had 135 inmates, June 1, 1895, maintained at a cost, for the year preceding, of $10,000. Twenty-five thousand dollars was appropriated in 1895 for the Soldiers' Home, a portion being for building and furnishing a hospital. At the beginning of 1895 the state prison had 172 inmates. The expenditures for the fiscal year ending Nov. 30, 1894, had amounted to $24,000, the earnings of the prisoners to $11,412.



CAPITOL BUILDING, CONCORD.

New Hampshire has 11 fish-hatcheries, the largest number of any of the states of the Union. Close enforcement of the laws relating to fish and game has resulted in abundance of both, especially of deer, and they are now more plentiful than for many years, although threatened with extinction before the passage of the protecting laws.

In 1891, $225,000 was appropriated for the erection of a state library, which was completed and dedicated Jan. 8, 1895. About 40,000 volumes had been gathered into the new library by Jan. 1, 1896. The building is one of the handsomest structures devoted to a like purpose in the United States, and is constructed almost entirely of redstone, Concord granite and green granite.

The National Guard of New Hampshire in 1895 was made up of an actually organized force of 120 commissioned officers, 1,120 infantry, 64 cavalry and 74 artillery. The infantry is divided into 3 regiments, each consisting of 2 battalions of 4 companies each. The cavalry is combined into one troop and the artillery into one battery, the entire military force of the state being formed into one brigade. The annual state appropriation is $30,000, the Federal donation of arms and accouterments ranging from $5,000 to $2,000, $3,450 being the amount donated in 1894.

On Jan. 1, 1899, there were 152 newspapers published in New Hampshire. One or more were published in all of the 10 counties, in 14 county seats, and in 65 of the cities, towns, and villages. Of these 17 were daily, 1 triweekly, 1 semiweekly, 118 weekly, 1 semimonthly, 13 monthly, and 1 quarterly.

In 1890 there were 783 church organizations in New Hampshire, with 774 edifices, a membership of 102,941,—27.34 per cent of the population of the state,—and church property of the value of $4,457,225. There were 24 denominations represented in the count, of which the principal ones were the Adventists, with 47 organizations; all Baptist bodies, 179; Roman Catholic, 68; Congregationalists, 188; all Methodists, 134; Protestant Episcopals, 44; and Universalists, 33.

The principal cities and towns of New Hampshire, with the populations as given in the census of 1900: Manchester, 56,987; Nashua, 23,898; Concord, 19,632; Dover, 13,207; Portsmouth, 10,637; Keene, 9,165; Rochester, 8,466; Somersworth, 7,023; Laconia, 8,042; Claremont, 6,498; Exeter, 4,922; Franklin, 5,846.

The following is a list of the governors of New Hampshire from 1775, with their respective terms of office:

Mesheck Weare	1775–85
John Langdon	1785–86
John Sullivan	1786–88
John Langdon	1788–89
John Sullivan	1789–90
Josiah Bartlett	1790–94
John Taylor Gilman	1794–1805
John Langdon	1805–09
Jeremiah Smith	1809–10
John Langdon	1810–12
William Plumer	1812–13
John Taylor Gilman	1813–16
William Plumer	1816–19
Samuel Bell	1819–23
Levi Woodbury	1823–24
David L. Morrill	1824–27
Benjamin Pierce	1827–28
John Bell	1828–29
Benjamin Pierce	1829–30
Matthew Harvey	1830–31
Joseph M. Harper	1831–
Samuel Dinsmore	1831–34
William Badger	1834–36
Isaac Hill	1836–39
John Page	1839–42
Henry Hubbard	1842–44
John H. Steele	1844–46
Anthony Colby	1846–47
Jared W. Williams	1847–49
Samuel Dinsmore	1849–52
Noah Martin	1852–54
Nathaniel B. Baker	1854–55
Ralph Metcalf	1855–57
William Haile	1857–59
Ichabod Goodwin	1859–61
Nathaniel S. Berry	1861–63
Joseph A. Gilmore	1863–65
Frederick Smythe	1865–67
Walter Harriman	1867–69
Onslow Stearns	1869–71
James A. Weston	1871–72
Ezekiel A. Straw	1872–74
James A. Weston	1874–75
Person C. Cheney	1875–77
Benjamin F. Prescott	1877–79
Nathaniel Head	1879–81
Charles H. Bell	1881–83
Samuel W. Hale	1883–85
Moody Currier	1885–87
Charles H. Sawyer	1887–89
David H. Goodell	1889–91
Hiram A. Tuttle	1891–93
John B. Smith	1893–95
Charles A. Busiel	1895–97
George A. Ramsdell	1897–99
Frank West Rollins	1899–1901
Chester B. Jordan	1901–03
Nahum J. Bachelder	1903–05
John McLane	1905–

See also NEW HAMPSHIRE, Vol. XVII, pp. 400–03.

NEW HAMPTON, a town, the capital of Chickasaw Co., Iowa, 20 miles E. of Charles City, on the Chicago, Milwaukee and St. Paul railroad; is the trade center of a rich farming region. Pop. 1890, 1,314; 1900, 2,339.

NEW HANOVER, an island of the Bismarck Archipelago, lying off the northeast coast of New Guinea, and having an area of 570 square miles.

Its physical characteristics resemble those of New Britain.

NEW HARMONY, a town of Posey County, Indiana, in the southwestern corner of the state. It is on the Wabash River, and is the terminus of a branch of the Peoria, Decatur and Evansville railroad, twenty-eight miles northwest of Evansville. It lies in an agricultural country, and has some flour and lumber mills, and a considerable traffic by way of the river. The place was once the home of Robert Owen (q.v.), the socialist, who endeavored there to develop a community based upon his peculiar doctrines. His experiment was a failure, but the town flourished after his departure. Its population in 1900 was 1,341. W.F.J.

NEW HARTFORD, a town of Litchfield County, Connecticut, in the northwestern part of the state. It lies on the Farmington River, 17 miles northwest of Hartford, in the center of a rich tobacco-growing region, and has some manufacturing industries. It is reached by the New York, New Haven and Hartford and the Philadelphia, Reading and New Haven railroads, and had in 1900 a population of 3,424. W.F.J.

NEW HAVEN, a city and the capital of New Haven County, Connecticut. The United States census for 1900 gives the following statistics of manufactures: Number of industries, 1,236; capital invested, $30,463,066; wages paid annually, $11,606,812; total value of products, $40,762,015; average number of employees, 22,136. New Haven has now 68 churches and 13 banks, of which 7 are national, 3 state and 3 savings; a building and loan association. It is now governed by three corporations: The city of New Haven, the town of New Haven, and the New Haven school district. Population 1890, 86,045; 1900 (12th U. S. census), 108,027. See also NEW HAVEN, Vol. XVII, p. 403.

NEW HOPE CHURCH, BATTLE OF. See ALLATOONA, in these Supplements.

NEW IBERIA, a town and the parish seat of New Iberia Parish, Louisiana, in the southern part of the state. It lies near Lake Fausse Pointe, and on Bayou Teche, is reached by the Southern Pacific railroad, is a center of the sugar and rice industries, is 100 miles west of New Orleans, and had in 1900 a population of 6,815. W.F.J.

NEW IRELAND. See NEW BRITAIN, Vol. XVII, p. 381; and NEW MECKLENBURG, in these Supplements.

NEW JERSEY had a population in 1900 of 1,883,669; that of 1890 having been 1,444,933. The increase during the decade was equal to 30.4 per cent, which was 2.88 per cent greater than the average percentage of increase of the United States for the period, and 7.79 per cent greater than the increase of the North Atlantic division of states. The rank occupied by New Jersey in 1900 was sixteenth, that of 1890 having been eighteenth. The density of population at the time of the taking of the twelfth decennial census was 250.3 to the square mile,—an increase since the taking of the preceding census from 192.0 to the square mile. The number of cities within the state having a population of 8,000 or over, in 1900, was 27, in which resided 1,153,001 of the citizens of the state, constituting 61.2 per cent of the entire population. In 1890 the number of cities of the same class was 20, their population 780,912, and the urban population con-

STATE SEAL OF NEW JERSEY.

stituted 54.0 per cent of the whole. In 1900 the male inhabitants numbered 941,760, the female 941,909; the percentage of native-born citizens of the state was 77.1; the number of negroes, 69,844, an increase of 22,206 during the preceding ten years. In 1900, the number of Chinese in the state was 1,393, of Japanese 52. The area of the state is 7,815 square miles, 290 being water.

In the area devoted to the cereals, New Jersey ranked, in 1890, thirtieth among the states and territories of the Union. The acreage in 1900 was 588,853 of which 44.51 per cent was under corn, 20.22 under wheat, 20.17 under oats, 12.84 under rye, 2.25 under buckwheat and .01 under barley. The total production of the cereals amounted to 14,553,475 bushels, corn leading with 10,978,800 bushels, oats coming next with 1,601,610 bushels, followed by wheat with 1,902,590 bushels; rye returned 831,410 bushels, buckwheat 234,275 bushels and barley 4,790 bushels. The number of farms increased from 30,828 in 1890, to 34,650 in 1900, the improved land decreased almost 22,000 acres, and the unimproved land increased over 1,000 acres. The total value of lands, fences, buildings, farm implements and machinery and live-stock fell off from $212,678,330 in 1880 to $189,533,660 in 1900. The number of horses in 1900 was 89,144,—an increase since 1890; the number of mules and asses was 4,864 in 1900, 9,267 in 1880; the number of cattle of all kinds was 212,062 in 1890, 240,984 in 1900; the number of milch cows was increased from 152,078 in 1880 to 157,407 in 1900; the number of swine was decreased from 219,069 in 1880 to 175,387 in 1900, and the number of sheep was decreased from 117,020 in 1880 to 47,730 in 1900. For 1900 the wool product amounted to 146,628 pounds; the gallons of milk numbered 77,714,055; the pounds of butter were 5,894,363; the acres in meadow were 444,610, from which were mown 542,796 tons of hay; 4,542,816 bushels of Irish potatoes and 2,418,641 bushels of sweet potatoes were produced; and in addition to the foregoing, grass-seeds, tobacco, broom corn and many varieties of pulse were produced.

The proximity of favorable markets has stimulated the vegetable and fruit raising industry. Among the latter, peaches, apples and grapes are the staples, while in vegetables every variety produced in the temperate zone is raised and marketed with profit.

In 1900 New Jersey stood sixth in rank among the

states in the value of manufactured products, in the average number of employees, and in the total annual wages paid. The census returns showed the number of specific manufacturing industries to be 15,481, the amount of capital invested to amount to $502,824,082, the average number of employees to have been 257,865, to whom wages to the amount of $129,777,551 were paid, while finished products to the amount of $611,748,933 were turned out. The principal lines, with the amount invested, the number of employees, the wages paid, and the total value of finished products for the year 1900 are shown in the following table:

Industry.	Capital.	Workers.	Wages.	Product.
Silk and silk goods	$29,285,792	24,157	$9,232,532	$39,966,662
Petroleum-refining	23,332,426	2,951	1,768,768	29,649,460
Foundry and machine-shops	31,550,687	17,918	9,375,824	32,621,229
Malt liquors	26,330,466	1,723	1,360,915	14,386,456
Rubber and elastic goods	6,078,155	2,609	1,150,543	8,940,723
Iron and steel	19,971,609	8,288	3,892,941	24,381,699
Dyeing and finishing textiles	11,600,695	7,074	3,003,491	10,488,963
Chemicals	17,284,675	3,048	1,575,132	12,207,289

In addition to the above, the following industries each yielded a return exceeding five million dollars: Electrical apparatus and supplies; jewelry; tobacco, smoking, chewing, and snuff; terra cotta and pottery products; cotton goods; lumber and planing mill products; glass; leather (tanned, curried, and finished), and worsted goods.

New Jersey has a great diversity of minerals, standing among the first ten states in the amount of iron ore annually produced, supplying the greater part of the zinc oxide and metallic zinc used in the United States, annually producing granite to the value of nearly half a million dollars, sandstone of about the same value, limestone in excess of one hundred thousand dollars in value, and ochre and mineral paint to a large amount. For building purposes, very fine gneiss, white and blue limestones, roofing-slates and flag and paving stones are quarried in abundance. Large quantities of graphite or plumbago, porcelain and pottery clays, infusorial earth, molding sand, sulphate of baryta, manganese, iron pyrites, greensand and many other commercial products are found in abundance among the mineral deposits of the state, which lack only coal to be complete in variety.

The report of the state treasurer for the fiscal year ending Oct. 31, 1900, showed the total receipts for the year to have been $3,453,296, the disbursements $2,701,226, which, deducted from the receipts and balance on hand at the beginning of the term, left a balance on hand on Nov. 1, 1900, amounting to $2,005,222. On Oct. 31, 1900, the total state debt amounted to $119,000, none of which was due and payable, and there were $713,242 in the sinking funds.

The reported value of the fisheries of the state for the year 1889 was $3,130,893, New Jersey standing fifth in rank among the states in this connection. The total number of persons to whom the boat-fishery industry gave employment was 3,342,—a greater number than were similarly employed in any other state. The total amount invested in the business was $271,186, the rank in this connection being that of third, while the value of the products, $1,019,508, was greater than that of any other state. In the sea-fishery industry the rank is not so high, but a large business is done in cod, lobster, shad, alewife and oyster fisheries, the total value of the last named exceeding one and one-half million dollars annually. The value of the annual catch of shad and alewife exceeds, on an average, $600,000.

A census of the children of school age was taken by legislative sanction in 1894, and revised in 1895 to meet changes made in the laws and in the boundaries of school divisions. The count of 1899 showed 466,714 children between 5 and 18 years of age attending the public schools, and 87,249 between the same ages not attending school. The report of the state superintendent of education for the school year 1898–99 showed the following facts: Number of male teachers, 756; average salary per month, $82.59; number of female teachers, 5,628; average monthly wages, $47.04; number of school buildings, 1,887; total value school property, $15,846,123; total enrollment in the public schools, 315,055; average daily attendance, 220,278; average time of school term, 9 months and 12 days. In addition to the admirable free-school system, New Jersey maintains several institutions for advanced education. Among these may be named the normal and model schools, the latter being self-supporting. The appropriation for the normal school for 1895 was $42,493; the number of graduates during the year, 134, all of whom became teachers within the state. The enrollment for the year was 868, and since the institution of the school in 1855 the number of graduates up to 1896 was 1,776. The Farnum Preparatory School at Beverly had expenses, during the year, aggregating $5,416, $1,200 of which was paid by the state, the remainder coming from interest on endowment, tuition and balance carried over. The Newark Technical School received, in 1895, $5,000 from the state, and for the purpose of industrial education and manual training the appropriation was $32,326. Many colleges of the state occupy high positions among the institutions of learning of this country, prominent among them being Princeton University (q.v., in these Supplements). Among the sectarian institutions of learning in New Jersey are two under the control of the Roman Catholic Church, the Seton Hall College at South Orange and St. Benedict's College at Newark. Rutgers College, located at New Brunswick, is non-sectarian.

At the beginning of 1900 there were 26 savings

banks in the state, whose combined resources amounted to $63,550,190. The number of depositors or open accounts was 202,682, the amount of deposits being $57,886,922. Twenty-one banks of deposit and discount, operating under the state laws, reported, for the same period as the savings banks, total resources of $10,651,701, their loans and discounts exceeding $7,500,000. Nineteen safe deposit and trust companies, with capital varying between $25,000 and $350,000, reported to the commissioner. Their combined resources amounted to $19,502,432, and the number of depositors was 39,397. The national banks numbered about 102, with aggregate capital approximating $15,140,000, and individual deposits of nearly $76,000,000.

In 1900 there were 2,257.42 miles of railroad tracks in the state, assessed at a valuation of $223,384,249, and paying taxes to the amount of $1,534,011. The miles of canal and feeders in the state were, at the same time, 173.34. The gross earnings of the entire railroad system of the state approximated $40,000,000,—a decrease, as compared with the previous year, of more than $2,500,000. In this connection, the report as to corporations within the state is of interest. In 1885 the number of corporations assessed was 797; the amount of taxes assessed, $235,769; in 1895 the number had reached 4,450, the amount of tax assessed being $1,092,744.

The state institutions of New Jersey were all in excellent condition at the opening of 1896. The

CAPITOL BUILDING, TRENTON.

School for Deaf Mutes, located at Trenton, had a total of 126 pupils,—65 boys and 61 girls. The appropriation for 1895 amounted to $55,139. During the year the state maintained 51 blind persons at the following-named institutions, having no provision for their support within the state:

New York Institution for the Blind, New York City.....33
Pennsylvania Institution for the Blind, Philadelphia....16
Connecticut School for Imbeciles, at Lakeville, Conn... 2

The total cost was $14,351, an average of about $282 for each person.

At Vineland is the School for Feeble-Minded Children, which, during 1895, had 198 pupils, the total cost of maintenance being $50,180, or about $253 per pupil. The Home for Feeble-Minded Women is also at Vineland. The patients during 1895 numbered 88, and the cost of maintenance was $21,790. There are two insane hospitals,—one located at Trenton, having, late in 1901, 1,371 inmates, and one located at Morris Plains, having at the same time 1,700. The expenses of the first-named institution for 1895 were nearly $60,000; of the latter, about $75,000. Both institutions were enlarged during 1896, the room for patients having proved very inadequate. The state prison, located at Trenton, had 977 inmates late in 1895, the cell-capacity having been at the time but 700. During the year, $173,000 was disbursed, and the sum of $52,702 received from the labor of the convicts. In 1895, $100,000 was appropriated for a state reformatory, to be located at or near Rahway. During 1896 the same was in course of construction and will be occupied during 1897. The State Reform School for Boys, located at Jamesburg, has a farm of 490 acres. At the close of 1895 the number of inmates was 376, the cost of whose maintenance, over and above the proceeds of the farms, was, for the year 1895, $60,106. The Industrial School for Girls, located near the city of Trenton, had, at the close of 1895, 119 inmates in the school, and 32 out at service, under indentures. The appropriation for 1895 amounted to $20,116. The New Jersey Home for Disabled Soldiers is located at Kearny, in Hudson County. It has been in existence from 1865, and up to 1895 had afforded care and relief to 18,492 persons. At the close of 1895 the number of inmates was 497, the cost of maintenance for the year being $30,000.

The National Guard of New Jersey in 1895 consisted of 325 officers and 3,613 enlisted men. This force was organized into sixty companies of infantry, two Gatling gun companies and two troops of cavalry. During the year, four companies of infantry, one Gatling gun company and one troop of cavalry had been organized. There were three companies of cadets attached to the National Guard, from which recruits are to be made for the guard as needed. A naval reserve, organized for the defense of the coasts and harbors of the state, was mustered into the service in 1895. The reserve was formed into two battalions of five divisions, the total number of officers was 23, and the petty officers and seamen numbered 245. (See NAVAL RESERVE, in these Supplements.) The ordinary expenses of the guard for 1895 were $187,540. Counted under the head of extraordinary expenses was the cost of building an armory at Paterson and one at Jersey City, the former requiring $139,590, and the latter $75,295, making the total amount appropriated for the guard for the year $402,426, in addition to which the Federal government contributed, in stores and munitions of war, the amount of $16,171.

New Jersey had, in 1890, 2,085 church organizations, 2,204 edifices, a total church membership of 508,341, and church property of the value of $29,490,414. The membership constituted 35.18 per cent of the entire population. There were 37 different denominations and 8 independent congregations. Of the denominations, the leaders, in point of numbers, of organizations were the Baptists, all bodies, 232; the Roman Catholics, 219, the Lutherans, all bodies, 68; the Methodists, all bodies, 727; the Presbyterians, all bodies, 307; the Protestant Episcopal, 186; and the Reformed, 147

On Jan. 1, 1899, there were 380 newspapers published in New Jersey, of which 51 were daily, 5 semiweekly, 289 weekly, 2 fortnightly, 5 semimonthly, 27 monthly, and 1 quarterly. Papers were published in all of the 21 counties, and in 140 of the cities, towns, and villages of the state. Of the last-named, 21 were county seats.

The following table shows the population of the principal cities and towns which had 8,000 inhabitants and over in 1900.

Cities and Towns.	Population.		Increase.	Per Cent.
	1890.	1900.		
Atlantic City	13,055	27,838	14,783	113.2
Bayonne	19,033	32,722	13,689	71.9
Bridgeton	11,424	13,913	2,489	.....
Burlington	7,264	7,392	128	.....
Camden	58,313	75,935	17,622	30.2
Elizabeth	37,764	52,130	14,366	38.0
Harrison	8,338	10,596	2,258	.....
Hoboken	43,648	59,364	15,716	36.0
Jersey City	163,003	206,433	43,430	26.6
Millville	10,002	10,583	581	.....
Morristown	8,156	11,267	3,111	.....
Newark	181,830	246,070	64,240	35.3
New Brunswick	18,603	20,006	1,403	.....
Orange	18,844	24,141	5,297	.....
Passaic	13,028	27,777	14,749	113.2
Paterson	78,347	105,171	26,824	34.2
Perth Amboy	9,512	17,699	8,187	.....
Phillipsburg	8,644	10,052	1,408	.....
Plainfield	11,267	15,369	4,102	.....
Trenton	57,458	73,307	15,849	27.6
West Hoboken	11,665	23,094	11,429	.....

Other cities and towns had in 1900 populations as follows: Bloomfield, 9,668; Bordentown, 4,110; East Orange, 21,506; West Orange, 6,889; South Orange, 4,608; Kearney, 10,896; Long Branch, 8,872; Montclair, 13,962; Rahway, 7,935; Red Bank, 5,428; Salem City, 5,811; South Amboy, 6,349.

The following is a list of the governors of New Jersey from 1776, with the date of their respective terms of office:

William Livingston.....1776–90	Rodman M. Price.....1854–57
William Patterson.....1790–94	William A. Newall.....1857–60
Richard Howell.....1794–1801	Charles S. Olden.....1860–63
Joseph Bloomfield.....1801–02	Joel Parker 1863–66
John Lambert.....1802–03	Marcus L. Ward.....1866–69
Joseph Bloomfield.....1803–12	Theodore F. Randolph....1869–72
Aaron Ogden.....1812–13	Joel Parker.....1872–75
William S. Pennington...1813–15	Joseph D. Bedle.....1875–78
Mahlon Dickerson.....1815–17	George B. McClellan.....1878–81
Isaac H. Williamson 1817–29	George C. Ludlow.....1881–84
Peter D. Vroom.....1829–32	Leon Abbett.....1884–87
Samuel L. Southard.....1832–33	Robert S. Green.....1887–90
Elias P. Seeley..... 1833–	Leon Abbett.....1890–93
Peter D. Vroom.....1833–36	George T. Werts.....1893–96
Philemon Dickerson.....1836–37	J. W. Griggs.....1896–98
William Pennington.....1837–43	Foster M. Voorhees.....1898–1902
Daniel Haines.....1843–44	Franklin Murphy.....1902–05
Charles C. Stratton.....1844–	Edward C. Stokes.....1905–
Daniel Haines.....1844–51	
George F. Fort. 1851–54	

NEW JERSEY, College of. See Princeton University, in these Supplements.

NEW JERSEY TEA (*Ceanothus Americanus*) (Gr., *kenteo*, to prick), the name of a genus of showy plants growing from one to twenty feet high, of the buckthorn family (*Rhamnaceæ*). The plant is known as the New Jersey tea shrub and is used as a substitute for tea. W.R.B.

NEW JERUSALEM CHURCH, popularly known as the Swedenborgian Church, is an organized body of Christians who base their faith upon the principles expounded by Emanuel Swedenborg (q.v., Vol. XXII, pp. 796–799). The first congregation founded in the United States was in 1792, at Baltimore. Since then the church has gradually spread, until in 1890 it was represented in 29 states and in the District of Columbia, having 154 church organizations and nearly 8,000 members. In 1901 the total membership in the United States had decreased to 7,679.

Each individual church manages its own affairs. The various congregations are formed into state associations, and representatives of these associations, together with delegates from unassociated societies, form the General Convention. There are three orders in the ministry. First, the general pastors who have supervision of the associations; second, pastors of societies or ordained ministers; and third, preachers not yet in full orders. In 1901 there were 8 general pastors, 143 pastors and 10 authorized preachers. A theological school is maintained at Cambridge, Massachusetts, which has an endowment fund of about sixty thousand dollars.

The faith of the New Jerusalem Church is based upon the word of God as found in the Old and New Testaments, interpreted in a spiritual or symbolic sense. This spiritual interpretation was disclosed through Emanuel Swedenborg, in whose time occurred, it is claimed, the second advent and the last judgment foretold in the New Testament. The last judgment is described as having taken place in the spiritual world in the year 1757. It showed that "all which is foretold in the Book of Revelation is fulfilled." The second advent was a coming, not in the flesh, but in the opening of the internal and spiritual sense of His Holy Word, and hence the descending of the Holy City, the "New Jerusalem,"—the establishment of a new church of the New Jerusalem, and the beginning of the new or second dispensation of Christianity.

The New Church, the church of the prophecy, is said to be the fifth in point of historic sequence. The most ancient church was that described in Genesis under the name of Adam. This was a church of perception, having no need of verbal revelation. The second church came into being when men had lost their internal worship, while the external remained, giving rise to the mythological and idolatrous worship of the Egyptians, Assyrians, etc. The third church was the Israelitish, the fourth the Christian, established by the apostles and evangelists, and the fifth the New Jerusalem, which takes its name from *Revelation*.

According to the teachings of this church, there are two essentials to which every doctrine of the church has relation: the acknowledgment of the Lord, and a life according to the precepts of the Decalogue. There is no vicarious atonement; re-

demption came through the subduing of the evil spirits of darkness by the divinely assumed humanity of Jesus Christ. Salvation implies faith, repentance and obedience to the moral law. The New Church holds that the Godhead is a trinity, not of persons, but of principles, corresponding to the soul, the body and the operative energy in man. It believes that all infants and children, and all who strive to live a good life in accordance with their religion, will be saved. It denies the resurrection of the material body, holding that the soul has a spiritual body of its own. It believes in the plenary inspiration of the Holy Scriptures, whereby they contain an internal sense, which is the Word of God. It teaches that heaven and hell exist in this world, as states of the soul, and are perpetuated in the spiritual world. Its interpretation of the Scriptures is based upon the "science of correspondences," or the analogy which exists between spiritual and natural things.

The New Church has a publishing house in Philadelphia. Among its periodicals are *The New Jerusalem Messenger*, New York; *The New Church Review*, Boston; and *The New Church Life*, Philadelphia. The educational institutions of the Church are Urbana University, Urbana, Ohio; Waltham Academy, Waltham, Massachusetts; The Academy Theological Seminary, Philadelphia, Pennsylvania; and The Convention Theological School, Cambridge, Massachusetts.

Authorities. Correspondences of the Bible, 2 vols., John Worcester; *The Science of Correspondences Elucidated*, by Edward Madeley; *Light on Current Topics*, Bennett Lectures for 1895; and the works of Emanuel Swedenborg, all issued from the publication houses of the New Church, at Philadelphia and Boston.

NEW KENSINGTON, a borough of Westmoreland County, Pennsylvania, in the southwestern part of the state. It lies on the Allegheny River, has glass works, foundries, paint works, and other industries, is reached by the Allegheny Valley railroad, and had in 1900 a population of 4,665. W.F.J.

NEW LEBANON, a town of Columbia County, New York, in the eastern part of the state, among the Berkshire Hills. It was long the seat of the chief community of Shakers in America, and is now a health resort. Its population in 1900 was 1,556. W.F.J.

NEW LEXINGTON, a village and the county seat of Perry County, Ohio, in the southeast-central part of the state. It is 52 miles southeast of Columbus, in a coal, clay and lumber country, and is reached by the Ohio Central and the Cincinnati and Muskingum Valley railroads. Its population in 1900 was 1,701. W.F.J.

NEW LISBON, now called simply LISBON, a village and the county seat of Columbiana County, Ohio, in the northeastern part of the state. It is 73 miles southeast of Cleveland, in a country rich in iron, coal, brick clay and agricultural resources. It is reached by the Erie and the Pittsburg, Marion and Chicago railroads, and had in 1900 a population of 3,330. W.F.J.

NEW LONDON, a town and city co-extensive, and the county seat of New London County, Connecticut, in the southeastern part of the state. It is at the mouth of the Thames River, is reached by the New York, New Haven and Hartford railroad, and has a large commerce by land and sea. It has many factories, shipyards, banks, academies, churches, etc. The Thames River there has long been used as a course for important college regattas, especially for the annual match between Yale and Harvard. The city had in 1900 a population of 17,548. See also in Vol. XVII, p. 409. W.F.J.

NEW LONDON, Wisconsin, a city divided between Outagamie and Waupaca counties, in the east-central part of the state. It is in a lumber region, and is reached by the Green Bay, Winona and St. Paul and the Chicago and Northwestern railroads. Its population in 1900 was 2,742. W.F.J.

NEW MADRID, a village and the capital of New Madrid County, southeastern Missouri, about 40 miles S.S.W. of Cairo, Illinois, on the Mississippi River; the shipping-point of a grain, cotton and stock raising district; also has several cottongins. Population, 1890, 1,193; 1900, 1,489.

NEWMAN, EDWARD, an English naturalist; born in Hampstead, May 13, 1801. He was a printer in London, but devoted much of his time to the study of natural history. In 1833 he founded the *Entomological Magazine*, which was merged in the *Entomologist* in 1840. In 1843 he established the *Zoölogist*. His publications include *History of British Ferns* (1840); *Dictionary of British Birds* (1866); *Illustrated Natural History of British Moths* (1869); *Illustrated Natural History of British Butterflies* (1871). He died June 12, 1876.

NEWMAN, FRANCIS WILLIAM, an English educator and author; born in London, June 27, 1805. He was an elder brother of Cardinal J. H. Newman (q.v.). After completing his education at Worcester College, Oxford, he was chosen fellow of Baliol in 1826, but resigned the office in 1830. During the three succeeding years he traveled in the East, and in 1834 became classical tutor in Bristol College, which he vacated in 1840, to assume the professorship of classics at Manchester New College. In 1846 he was nominated professor of the Latin language and literature in University College, London. He resigned in 1863. As a philologist he attained high rank and published *A Grammar of the Berber Language; The Odes of Horace, Translated into Unrhymed Meter* and the *Iliad* of Homer. His peculiar and theological opinions were expressed in his *Lectures on Political Economy; The Crimes of the House of Hapsburg against Its Own Liege Subjects; The Soul: Its Sorrows and Its Aspirations; Phases of Faith* and a *History of the Hebrew Monarchy from the Administration of Samuel to the Babylonish Captivity*. He also wrote *Lectures on Logic* (1838); *The Difficulties of Elementary Geometry* (1841); *Catholic Union* (1844); *Royal Rome* (1852); *Hiawatha Translated into Latin* (1862), and *Early History of Cardinal Newman* (1891). He died in Weston-super-Mare, Somerset, October 4, 1897. W.M.C.

NEWMAN, John Henry, Cardinal, a leader of the Oxford Tractarian movement of 1833 in the Church of England; was born in London, Feb. 21, 1801. He graduated from Oxford University when he was only 19. In 1821 he wrote, jointly, with a friend, two cantos of a poem on *St. Bartholomew's Eve*. He was elected a fellow of Oriel College in 1822, and later became associated with Pusey, Keble and others in the publication of the *Oxford Tracts*. He was also associated with Hurrell Froude, brother of the historian, in originating the Tractarian movement. Here, also, he formed cordial relations with Dr. Hawkins, afterward the provost of the college, and Whately, subsequently archbishop of Dublin. Both of them exercised great influence over him by teaching him to define his thoughts clearly. Newman's first book was that on the *Arians of the Fourth Century*. It was a scholarly production, intended to show that the Arian heresy was not of Alexandrian origin, but was one of the Judaizing heresies which sprang up in Antioch. In 1832 Newman, then in delicate health, accompanied Hurrell Froude in a Mediterranean tour, and it was then that the fire kindled which was to bear fruit in the Anglican movement of 1833, the aim of which was to seek a basis for clerical authority independent of the state, with perhaps a vision of restoring the Church of England to Catholicism. Most of Newman's smaller poems were written on this voyage, and were published in *Lyra Apostolica*, a volume of verse, the object of which was to reassert for the Church of England her spiritual authority and mission. It was on this tour that Newman met Cardinal Wiseman, and told him, in reply to the expression of a courteous wish that Hurrell Froude and he might visit Rome, "We have a work to do in England." At Rome, Newman left his friends to go alone to Sicily, where he fell ill of malarial fever. His mind was deeply possessed during his illness by spiritual things. Becalmed in the Straits of Bonifacio, he wrote the best-known of all his poems, "*Lead, Kindly Light*" (see Hymns, Vol. XII, p. 630). From Marseilles he proceeded to England, reaching home in time to be present at Keble's Oxford assize sermon on *National Apostasy*, which he always regarded as the date at which the Tractarian movement began. Into the series of *Tracts for the Times* Newman threw himself with great energy, actuated by a Catholic theory of the English Church which had taken root in his imagination. In 1837, in a course of lectures, he made an attempt to distinguish the Anglican *via media* from the doctrines of the Church of Rome.

CARDINAL NEWMAN.

The famous *Tract 90*, which came from Newman's pen, brought on an explosion which was the end of the Tractarian movement, and hastened many conversions to Rome. Newman struggled for two years longer to think his position tenable, but in 1843 resigned the vicarage of St. Mary's, and withdrew from the English Church. In October, 1845, he was received into the Roman Catholic Church, and then went to Rome for a year and a half. On his return in 1848, he published *Loss and Gain*, the story of an Oxford conversion very different from his own, but full of happy and delicate sketches of Oxford life and manners. Shortly afterward he produced *Callista*, the story of a martyr in Africa of the third century.

In 1849 Newman established a branch of the Brotherhood of St. Philip Neri in England, and retired to a suburb of Birmingham, where he did a great deal of hard work, devoting himself to the sufferers from cholera in 1849 with the utmost zeal. The lectures on *Anglican Difficulties*, intended to show that Tractarian principles could only issue in submission to Rome, was the first book which drew public attention to Newman's great power of irony and the singular delicacy of his literary style. These lectures were followed by the lectures on *Catholicism in England*, which gave occasion to Dr. Achilli's action for libel against him. In 1864 a casual remark by Canon Kingsley led to a correspondence which resulted in the publication of the remarkable *Apologia pro Vita Sua*, the most fresh and effective religious autobiography of the nineteenth century, and perhaps the most fascinating of his many works, as it is the most personal. In 1865 he wrote *The Dream of Gerontius*, a poem of marvelous subtlety and pathos. In 1870 he published his *Grammar of Assent*, a book on the philosophy of faith. His other writings, besides a work on the *Development of Christian Doctrines*, are chiefly a voluminous series of sermons which are full of the charm of his sweet disposition. In the controversies which led to the Vatican Council, Newman sided with the Inopportunists. He was at this time in vehement opposition to the Ultramontanes, and nothing seemed less likely than that Newman should ever become a cardinal, but after the death of Pio Nono, and the election of Leo XIII, the policy of the church altered, and the new Pope was anxious to show his sympathy with the English Catholic moderates, of whom Dr. Newman was much the most distinguished. Accordingly, in 1879, Newman was summoned to Rome to receive the cardinal's hat. For the last eleven years of his life Cardinal Newman, who now lived at his Edgebaston oratory, seldom broke silence. He was a man "of the highest moral and spiritual aspirations, of rare intellectual gifts, of fine sensibilities, and of exquisite culture." He died at Edgebaston, near Birmingham, Aug. 11, 1890. *Revised by* W.R.C.

NEWMAN, John Philip, an American clergyman; born in New York city, September 1, 1826. He was educated at Cazenovia Seminary, entered the ministry in 1849 and held various pastorates in the Methodist Episcopal Church. In 1872 President Grant appointed him inspector of consulates in Asia, and in this capacity he made a tour of the world. In 1888 he was elected bishop. He has published *Christianity Triumphant* (1884); *Evenings with the Prophets* (1887), and *The Supremacy of Law* (1890). W.M.C.

NEWMARKET, New Hampshire, a town of

Rockingham County, in the southeastern part of the state, nine miles from Portsmouth, and on the Boston and Maine railroad. It is largely engaged in cotton manufactures, and had in 1900 a population of 2,892. W.F.J.

NEWMARKET, Canada, a town of York County, in the Province of Ontario, 35 miles north of Toronto. It is reached by the Grand Trunk railroad, has some manufactures, and has a population of more than 2,100. W.F.J.

NEW MECKLENBURG, formerly called NEW IRELAND, one of the two chief islands of the Bismarck Archipelago, a German colonial possession in Melanesia, lying just east of New Guinea, and northwest of the Solomon Islands. It is of irregular form, 200 miles long from southeast to northwest, and averaging about 25 miles wide. It is chiefly a mountainous country, inhabited by savages, and has been little colonized. See also NEW BRITAIN, Vol. XVII, p. 381. W.F.J.

NEW MEXICO had a population in 1900 of 195,310,—a gain of 41,717 during the ten years pre-

SEAL OF THE TERRITORY OF NEW MEXICO.

ceding,—an increase of 27.2 per cent. Its rank in 1900 was forty-third, that of 1880 having been forty-first. The density of population at the first-named period was 1.6 to the square mile; at the latter period, .98 to the square mile. The population was made up, in 1900, of 104,228 males and 91,082 females; the percentage of native-born population was 93.0; the number of negroes was 1,610,—a decrease of 346 since 1890; the Indians numbered 13,144; there were 341 Chinese and 8 Japanese. The latest corrected surveys of the territory show the area to be 122,580 square miles, of which 120 square miles are water surface, leaving the land surface 122,460 square miles, 78,374,400 acres. This gives New Mexico the rank of fourth in the matter of area, only Texas, California, and Montana, in the order named, exceeding it in size.

In 1899 the total area devoted to the cereals was 96,264 acres, of which 82.3 per cent was under corn and wheat, 16.5 per cent under oats, 2.42 under barley, .11 under rye and .13 under buckwheat; 41,345 acres under corn yielded 677,305 bushels; 37,907 acres under wheat yielded 603,303 bushels; 15,848 acres under oats yielded 342,777 bushels; 1 110 acres under barley yielded 24,107 bushels; 48 acres under rye yielded 1,064 bushels; and 6 acres under buckwheat yielded 73 bushels. In the Western division of states, 10,746 asses were reported on farms in 1890, 5,958, or 55.44 per cent, of which were found in New Mexico. Cattle on farms numbered less than ten to the square mile, sheep were decreased in number 1,464,337 according to the count of 1880, and the annual supply of milk was five gallons *per capita*. The total number of farms in 1900 was 12,311,—an increase of about 8,000 since 1890; the total acreage was 5,130,878,—an increase of about 4,342,996 acres since 1890; the improved land in farms was 326,873 acres,—an increase of 63,660 acres in the period mentioned; and the unimproved land in farms was increased about 4,280 acres. The total value of lands, fences, buildings, farm implements and farm stock was given in the last census at $53,767,824, the census of 1890 giving the value at $15,679,120. The following is the showing, as to farm stock and products, for the two years, 1890 and 1900:

	1890.	1900.
Horses	38,130	131,153
Mules and asses	8,367	21,213
Neat cattle	577,511	975,084
Milch cows (included above)	18,507	16,775
Swine	10,471	20,426
Sheep, not including spring lambs	1,248,970	3,333,743
Pounds of wool clipped	4,074,503	15,209,199
Gallons of milk produced	717,155	633,638
Pounds of butter	86,042	116,816
Pounds of cheese	18,931	38,164
Tons of hay harvested	47,253	196,545
Acres of meadow mown	26,375	88,765
Bushels of Irish potatoes	35,999	72,613
Bushels of sweet potatoes	5,351	6,180

The soil and climate of New Mexico are both favorable to many agricultural products that have not been extensively grown. Up to 1896 fully 90 per cent of the butter, eggs and poultry used in the territory was brought from other states, while the conditions for both dairying and the raising of poultry could scarcely be excelled. Up to the same date not a broom had been made in New Mexico. Every condition is favorable for the propagation of the corn, and the long dry seasons very advantageous for curing. Alfalfa produces as much as four tons to the acre, and the product, when cured, as well as when green, is excellent food for hogs; still, all of the hog products placed on sale were, as late as 1895, imported. Fruit flourishes in New Mexico, especially in the Rio Grande valley, south of Albuquerque, where the vineyards produce grapes as large and luscious as those grown in France, and the pears and peaches rival those of California. Under irrigation, apples, peaches, nectarines, pears and many of the small fruits thrive and yield abundantly. Much of the land in New Mexico is arid from lack of sufficient rainfall. Irrigation brings bounteous crops, and much capital has been invested in constructing dams, ditches and canals, thus reclaiming vast areas. (See IRRIGATION, in these Supplements.)

In 1900, New Mexico had 420 specified manufacturing industries, in which $2,698,786 was invested as capital, 2,600 persons being employed, to whom $1,350,586 were paid as wages, and products turned out to the value of $5,605,795. The principal industry was lumber and other mill products, which returned $551,108. Flouring and grist mill products

aggregated $551,108, and cars and general shop construction amounted to $1,069,280.

Many minerals and varieties of precious stones are found in New Mexico. The production of minerals has decreased somewhat from the census figures, which placed the value of the output of 1889 at $4,611,764, of which $815,655 was from gold and $1,251,124 from silver. For 1900 the gold produced was of the value of $900,000, the silver being about $366,000. In 1901 these values were both decreased, but in 1902 they were again expected at the same point as in 1900. Large amounts of capital are invested in the gold and silver mines, and estimates of the possible annual product reach as high as $5,000,000. The copper produced in 1896 amounted to 2,701,664 pounds; lead and zinc amounted to 13,733 tons of base bullion of the former and 140 tons of the latter. Coal, both anthracite and bituminous, is found in abundance in many parts of the territory, the amount mined for shipment in 1900 reaching nearly 1,187,334 tons. Iron ore of superior quality is abundant and in close proximity to the best coal; salt is found in great quantities; gypsum in several places; carbonate and sulphate of soda exist in exhaustless bodies; alum in an almost pure state has been discovered and worked to some extent; while all of the best varieties of stone, as well as marbles of great beauty, exist in deposits of great extent; and kaolin and other valuable clays have been found in many parts of the territory. The precious stones consist of emeralds, turquoises, garnets, opals, agates and petrified woods crystallized so as to be suitable for jewelry. Turquoises have been found of the value of $4,000 for a single gem.

From one silver-mine in Sierra County $6,500,000 was taken from 1880 to 1895, and at Lake Valley over $3,500,000 was taken from a single pocket. During the 15 years mentioned above, the output of gold, silver, lead and copper from the city of Socorro was valued at $58,000,000.

The thermal springs of New Mexico are excelled only by those of the famous Yellowstone National Park. Those at Folsom, in Colfax County, are close to the extinct volcano of Capulin, at an altitude of 6,500 feet above the sea. The Las Vegas Hot Springs, in San Miguel County, are perhaps the best known of the many in the territory, by reason of their curative virtues. They are 22 in number, and the water very much resembles that of the famous hot springs of Teplitz, in Austria. The temperature of the different springs varies from 80° to 140°. In the midst of the location occupied by the ancient Cliff-Dwellers, 6,000 feet above the sea, are the Ojo Caliente (Hot Springs), about 50 miles north of Santa Fé. Their temperature ranges from 90° to 122°, and their gases are carbonic. Other hot springs of prominence are Jemes Hot Springs, in Bernalillo County, which include a geyser with an opening one foot square; the Cherryville Springs, altitude 6,540 feet and temperature 130°; the Apache Tajoe Springs, in Grant County, four miles from White Water; and Hudson Springs, at an altitude of 5,782 feet, average temperature 130°, three miles from Hudson, on the Santa Fé railroad. The Aztec Springs, four miles east of Santa Fé, are cold water, with 18 grains of solid material to the gallon, the water very much resembling the most celebrated of the German springs.

During the Congressional term of 1874–75 both Houses of Congress adopted a bill providing for the admission of New Mexico as a state, but the House not agreeing to amendments made to the bill by the Senate, the act was not passed. Again, in 1894, an enabling act was passed, which, after prescribing various provisions for the state constitution, appropriated 9,910,000 acres of the public domain for colleges, water-reservoirs, asylums, normal schools, schools of mines, reform school and miscellaneous purposes. No action had been taken on this act up to 1896.

There were about 1,758 miles of railway lines in New Mexico in 1900. Very little construction progressed from 1890 up to the date given. The Atchison, Topeka and Santa Fé is the main line of road in the territory.

The report of the public schools of the territory made in 1901 is incomplete. The report of the preceding year shows the number of school districts to be 900, the number of teachers, 1,150; the number of persons between 5 and 20 years (the school age), 53,008; the number of pupils enrolled, 47,700; the average daily attendance, 31,800; the average number of months of school, 4; the total receipts for school purposes, $251,107; the total amount expended, $235,750. The leading institution of higher education is the University of New Mexico, located at Albuquerque (q.v., in these Supplements). Other institutions are the Agricultural College, at Las Cruces; the Military Institute, at Roswell; two normal schools, one at Silver City and one at Las Vegas; the School of Mines, at Socorro; the Institution for the Deaf, Dumb and Blind, at Santa Fé; and the Indian Industrial Schools, at Santa Fé. There are several private and religious educational institutions in the territory. The Methodist Episcopal Church has 8 schools, with 12 teachers, 300 pupils, school property valued at $15,000 and a library of 620 volumes. The Presbyterian Church maintains 28 day and boarding schools, employs 50 teachers, has 1,615 pupils enrolled; their school buildings are valued at $52,750; the salaries paid amount to $25,000 annually, and other expenses connected with the work amount to nearly $10,000. The St. Vincent Hospital and the St. Vincent Territorial Orphans' Home and Industrial School, although territorial institutions, are under the control of the Sisters of Charity. For the former the legislature appropriates $6,000, and for the latter, which is for girls only, $5,000 annually. The Catholic Church also controls several other schools throughout the territory, and there are also a number of mission schools sustained by the Methodist Episcopal Church.

The Insane Asylum, located at Las Vegas, having proven inadequate for the number of patients applying for admission, the legislature, in 1895, made an appropriation of $35,000 for enlarging the same. June 30, 1895, there were confined in the penitentiary 191 prisoners, the cost of whose maintenance for the preceding year had amounted to 38.84 cents per

day per man, which sum included salaries for all officers, employees, commissioners, medical attendance, etc., as well as subsistence and clothing. The territory sustains four charitable hospitals, one at Santa Fé, one at Las Vegas and two at Silver City, where indigent persons are supported at the expense of the public.

In 1900 taxes were levied on property of the total equalized value of $39,090,501. The total amount of taxes levied was $304,636, for the following purposes: For territorial expenses, $233,683; for casual deficit, bond interest, $10,288; for territorial institutions, $58,435; for cattle indemnity, $2,227. Debt of territory (1901), $1,180,800.

The National Guard of the territory of New Mexico consists of five companies of infantry and three troops of cavalry. One of the latter consisted of La Guna Indians, officered by Americans, and had made an enviable record against the renegade Indians, headed by Victorio and Geronimo. The membership of the other companies consisted largely of frontiersmen who have served the territory whenever their services have been required. No appropriation had ever been made up to 1896 for the support and maintenance of the National Guard, and in the campaigns in which many of the companies have been engaged, some of which lasted for periods of upward of four months, they furnished their own horses and had subsistence supplied by the citizens.

In 1890 there were, in New Mexico, 463 church organizations, 381 edifices, a membership of 105,749, which constituted 68.85 per cent of the population, and church property of the value of $531,925. There were 12 different denominations, the most prominent, in point of numbers, being the Regular Baptists, North, 15 organizations (the only Baptists in the territory); Roman Catholics, 317 organizations; all Methodists, 60; all Presbyterians, 39; and Protestant Episcopal, 16.

On Jan. 1, 1899, there were 56 newspapers published in the territory, of which 4 were daily, 1 semiweekly, 48 weekly, and 3 monthly. Papers were published in 14 of the 18 counties, and in 28 of the cities, towns, and villages, of which 13 were county seats.

The principal cities and towns of New Mexico, with their populations as given in the census of 1900, are given herewith: Santa Fé, 5,603; Albuquerque (city), 6,238; Las Vegas, 3,552; Silver City, 2,735; Albuquerque (old), 1,191; Socorro, 1,512; Raton, 3,540; and Roswell, 2,006.

The following is a list of the governors of New Mexico since the organization of the territory, with their respective terms of office: James S. Calhoun, 1851–52; William C. Lane, 1852–53; Solon Borland, 1853; David Merriwether, 1853–57; Abraham Rencher, 1857–61; Henry Conolly, 1861–65; Robert B. Mitchell, 1865–67; W. F. M. Army (acting), 1867–69; William A. Pile, 1869–71; Marsh Giddings, 1871–76; Samuel B. Axtel, 1876–78; Lewis Wallace, 1878–81; L. A. Sheldon, 1881–85; E. G. Ross, 1885–89; L. B. Prince, 1889–93; W. T. Thornton, 1893–97; Miguel A. Otero, 1897; reëlected, 1901. See also NEW MEXICO, Vol. XVII, pp. 409–412.

NEW MEXICO, UNIVERSITY OF, a state institution of learning at Albuquerque, provided for by an act of the legislature of 1888–89, and organized in 1892. It is equipped and supported by territorial appropriations. It is expected that when New Mexico receives statehood the institution will receive a liberal grant of public lands, as has been the practice in regard to similar institutions in other states. Owing to the sparse population, the board of regents found it advisable to receive students many of whom properly belong in high schools, thus repeating the history and experience of other youthful institutions. There is attached to the university a preparatory school of a two years' course, from which scholars can proceed to the university itself. In 1901 there were 10 instructors and 105 students; and the total income was $12,653.

NEW MILFORD, a town of Litchfield County, Connecticut, in the western part of the state. It lies on the Housatonic River, a few miles from the New York line, and is reached by the Housatonic branch of the New York, New Haven and Hartford railroad. It had in 1900 a population of 4,804. W.F.J.

NEWNAN, Georgia, the seat of Coweta County; a manufacturing city and agricultural trade center, on the Atlantic & West Point, and Central of Georgia railroads, 38 miles S.W. of Atlanta. It has flour, cotton and oil mills, machinery and building material factories. Population, 1890, 2,859; 1900, 3,654. C.L.S.

NEW NETHERLANDS, THE FOUNDING OF. See UNITED STATES, Vol. XXIII, p. 780.

NEWNHAM COLLEGE, England, an institution for the higher education of women, founded at Cambridge in 1871, consequent on the success of the systematic courses of lectures delivered by professors of the university to women in the preceding year on various branches of literature and science. The lectures resulted in the formation of an association to maintain and develop the system and to provide pecuniary assistance to enable promising students to continue their education. A small house provided for students was soon found inadequate in its accommodation, and in 1874 a company was formed for the purpose of erecting Newnham Hall, which was opened the following year and is now known as the South Hall of Newnham College, the success of the undertaking having called for additional buildings. Since 1874, informally, and since 1881, officially, students are admitted to the university tripos examinations, receiving, however, certificates instead of degrees. The faculty numbers 15 resident and 37 non-resident teachers. C.L.S.

NEW ORLEANS, the chief city of Louisiana. Jan. 1, 1890, the municipal debt aggregated $17,009,209.82. The real and personal property of the city was listed at $122,000,000 and the rate of taxation fixed at 20 mills per $100.

The principal manufacturing industries, as reported by the United States census of 1900, show the following figures. These are the figures as given in the comptroller's report for the year. The total assessment valuation includes both real and personal property:

Principal Manufacturing Industries. (1900.)	No. of Establishments Reporting	Aggregate Capital Invested.	Wages Paid.	Total Value of Products.	Average Number of Employees.
Carriages and wagons, including custom work and repairing	24	$ 149,489	$ 93,514	$ 269,491	221
Clothing, men's, factory products	24	1,154,956	386,809	2,036,069	2,045
Cooperage	55	245,017	120,830	515,835	317
Cotton, cleaning and rehandling	....	.....	.....	.....	....
Cotton, compressing	.....	.....	.....	.....	....
Cotton, ginning	.....	.....	.....	.....	....
Foundry and machine-shop products	39	2,235,868	525,783	2,199,854	1,015
Furniture, factory products	6	256,420	78,152	312,923	238
Liquors, malt	6	3,299,326	224,985	1,472,062	374
Lumber and other mill products from log or bolt	10	1,345,907	205,084	1,403,345	543
Lumber, planing-mill products, including sash, doors and blinds	9	485,957	127,157	552,250	321
Rice, cleaning and polishing	9	855,234	78,346	2,924,564	153
Sugar and molasses refining	10	17,773,184	407,859	22,684,920	781
Oil, cottonseed and cake	5	670,736	64,786	1,043,623	158
Tobacco, cigars and cigarettes	27	502,518	402,934	1,388,305	1,176

As a shipping-point, New Orleans stands as one of the most important in the country. The following statistics from the United States census of 1898 will show some of the most important facts in regard to the city's traffic by water.

Tons of freight moved and miles covered by the passenger and freight-carrying vessels, exclusive of ferry-boats:

Coal.	Lumber.	Stone.	Ice.
3,580	415,128	1,974	299

Cement, Brick and Lime.	All Other Commodities.	Total.	Miles Covered.
12,955	467,689	901,625	821,236

Summary showing the amount of freight moved and miles traveled by the passenger and freight-carrying vessels in the various traffic districts: Tons of freight moved, 1,144,754; number of miles traveled, 1,288,267.

Equipment, occupation and construction; equipment of fleets in general:

Total of All Crafts.			Steamers.		
Numb'r.	Tonnage.	Valuation.	Numb'r.	Tonnage.	Valuation.
283	36,304	$1,910,060	56	31,407	$1,712,700

Sailing-Vessels.			Unrigged Crafts.		
Numb'r.	Tonnage.	Valuation.	Numb'r	Tonnage.	Valuation.
214	4,247	$194,360	13	650	$300

Financial account in general; gross earnings, expenses and net earnings of the passenger and freight-carrying vessels, exclusive of ferry-boats:

Total.			Steamers.		
Gross Earnings.	Expenses.	Net Earnings.	Gross Earnings.	Expenses.	Net Earnings.
$1,943,309	$1,439,731	$503,578	$1,685,854	$1,231,311	$454,543

Sailing-Vessels.			Unrigged Crafts.		
Gross Earnings.	Expenses.	Net Earnings.	Gross Earnings.	Expenses.	Net Earnings.
$254,655	$206,420	$48,235	$2,800	$2,000	$800

Employees' wages; total wages paid during the year to employees making ordinary crews of the passenger and freight-carrying vessels, exclusive of ferry-boats:

All Crafts.		Steamers.	
Number Making Ordinary Crews.	Wages Paid During Year.	Number Making Ordinary Crews.	Wages Paid During Year.
1,041	$303,456	500	$172,796

Sailing-Vessels.		Unrigged Crafts.	
Number Making Ordinary Crews.	Wages Paid During Year.	Number Making Ordinary Crews.	Wages Paid During Year.
538	$129,220	3	$1,440

The most notable building of New Orleans is the United States custom-house, the largest public building in the United States excepting the capitol and treasury buildings at Washington, built of Quincy (Massachusetts) marble; next is the city hall, on St. Charles Street, built of white marble; then come the Tusco-Doric court-houses, on Jackson Square; the Roman Catholic Cathedral of St. Louis; the Merchants' Exchange, built of marble; the Masonic and Odd Fellows' halls; St. Patrick's hall, with a seating-capacity of three thousand five hundred; the Hotel Royal; Exposition hall; Mechanics' Institute; Sugar and Produce exchanges; new Cotton Exchange; Howard Memorial Library, erected by Miss Annie Howard in memory of her father; Sophie Newcomb Memorial College; Charity Hospital; United States Marine Hospital; the Hotel Dieu; French opera-house; Academy of Music; National, Varieties and St. Charles theaters, and the French market.

The following railroads run into New Orleans: The Illinois Central; the Louisville and Nashville; the New Orleans, Fort Jackson and Grand Isle; the New Orleans and North Eastern; the New Orleans and Southern; and the Southern Pacific.

In 1890 there were 180 churches, including almost every denomination: 55 Baptist, 31 Roman Catholic, 11 Methodist Episcopal, 11 Lutheran, 6 Evangelical Protestant, 5 Congregational, 5 Hebrew, 1 Unitarian, 1 Christian, 1 Greek.

The census of 1890 showed 54 grammar-schools and 3 high-schools, besides numerous private colleges, schools and academies; the Tulane University (q.v., in these Supplements); New Orleans University; the Jesuit College; the Southern University, a state institution; the Leland University; and the Straight University (q.v., in these Supplements), which is exclusively for colored students.

There are six lines of street-railways, amounting in distance to about one hundred and fifteen miles.

New Orleans has 8 daily papers, 28 weekly, 3 semi-weekly, 5 monthly and 2 semimonthly. Population 1890, 242,099; 1900, 287,104. See NEW ORLEANS, Vol. XVII, p. 412.

NEW ORLEANS, BATTLE OF, occurred Jan. 8, 1815, at New Orleans, Louisiana, between the troops of Great Britain under General Pakenham and the United States troops under General Andrew Jackson. The British forces had been concentrating at Lake Borgne, near New Orleans, preparatory to an attack upon the city. Their movements were watched closely by Jackson, and, as they began the march toward the city in December, 1814, he advanced to meet them on a plain called Chalmette, five miles from the city. There, Dec. 23d, 28th and Jan. 1st, sharp engagements took place, in which Jackson was victorious. Pakenham was reinforced, and Jan. 8, 1815, with 10,000 men attacked the fortifications of the city, manned by only 5,000 men. Jackson had valuable assistance from the gunboat *Louisiana*, which bombarded the British camp. The British made a fierce attack upon the breastworks, but were met by such a musketry-fire that they fell back in great disorder. The three British generals were wounded severely, one of them mortally. The loss to the Americans was 8 killed and 13 wounded; to the British, 700 killed, 1,400 wounded and 500 taken prisoners.

NEW PHILADELPHIA, a city and the county seat of Tuscarawas County, Ohio, in the central-eastern part of the state. It is on the Tuscarawas River and the Ohio and Erie canal, and is reached by the Cleveland, Lorain and Wheeling and the Pennsylvania railroads. It is largely given to coal, iron and salt industries, and to varied manufactures. Its population in 1900 was 6,213. W.F.J.

NEWPORT, a village of Jackson County, central-northeastern Arkansas, 32 miles E. of Harrisburg, on the White and Black River Valley railroad; has saw, shingle and planing mills; stair, oil and stave works; also foundries and machine-shops. Population, 1890, 1,571; 1900, 2,866.

NEWPORT, Kentucky, a city and the county seat of Campbell County, in the extreme northern part of the state. It lies on the Ohio River, opposite Cincinnati, Ohio, and is an important commercial and manufacturing center, having a large river trade and being reached by the Chesapeake and Ohio and the Louisville and Nashville railroads. It is at the mouth of the Licking River, which separates it from Covington. Its population in 1900 was 28,301. W.F.J.

NEWPORT, New Hampshire, a town and the county seat of Sullivan County, in the western part of the state. It is thirty-three miles west by north from Concord, on the Boston and Maine railroad, and is near Mount Sunapee and Lake Sunapee, and thirteen miles from the Connecticut River and Mount Ascutney in Vermont. Its situation makes it a favorite summer resort, and it also has extensive industries. Its population in 1900 was 3,126. W.F.J.

NEWPORT, a borough of Perry County, eastern-central Pennsylvania, 6 miles N.E. of New Bloomfield and 28 miles N.W. of Harrisburg on the Juniata River, the Pennsylvania Canal, and the Pennsylvania and the Newport and Sherman Valley railroads; is in an agricultural region, and has a tannery, a planing-mill, a furnace, foundry, pottery, and glue factory. Population, 1900, 1,734.

NEWPORT, Rhode Island, the county seat of Newport County, formerly one of the capitals of the state, lies on the southern end of Aquidneck or Rhode Island, between Narraganset Bay (q.v.) and the Sakonnet River, also fronting upon the Atlantic Ocean. It has long been the most fashionable summer resort of America, and is a great center of yachting. It is the site of the United States Naval War College. It is reached by steamers from New York and by the New York, New Haven and Hartford railroad. Its population in 1900 was 22,034. W.F.J.

NEWPORT, Vermont, a township and village of Orleans County, on the northern border of the state. The village lies at the mouth of Black River and at the head of Lake Memphremagog. It is reached by the Central Vermont and Boston and Maine railroads, and had in 1900 a population of 1,874. W.F.J.

NEWPORT NEWS, a town and the county seat of Warwick County, Virginia, in the southeast corner of the state. It lies on the north shore of the great estuary of the James River, is reached by the Chesapeake and Ohio railroad, is the seat of one of the chief shipbuilding yards of America, and is rising into prominence as a shipping point for grain and other commodities, being now the fourth largest grain port of the United States. Its population in 1900 was 4,449. W.F.J.

NEW PROVIDENCE. See BAHAMAS, Vol. III, p. 204.

NEW RED SANDSTONE. See GEOLOGY, Vol. X, p. 311.

NEW RICHMOND, a village of Clermont County, southwestern Ohio, 11 miles S.W. of Batavia, on the Cincinnati, Georgetown and Portsmouth railroad; has woolen-mills, brick and furniture works, flour-mills and other industries. Population, 1890, 2,379; 1900, 1,916.

NEW RICHMOND, a village of St. Croix Co., eastern Wisconsin, 15 miles N.E. of Hudson and 90 miles E.N.E. of Eau Claire, on Willow River, and on the Chicago, St. Paul Minneapolis and Omaha rail-

road. It has water-power, running a large flour-mill. Pine and hardwood timber is abundant in the district, and pine lumber is largely manufactured here. Population 1900, 1,631.

NEW ROCHELLE, a residence city of Westchester County, New York, on Long Island Sound, 18 miles from New York, on the New York, New Haven and Hartford railroad. It was founded by French Huguenots. Its population in 1900 was 14,720. W.F.J.

NEW SIBERIAN ISLANDS. See SIBERIA, Vol. XXII, p. 10.

NEW SOUTH WALES. For history, geography, etc., see NEW SOUTH WALES, Vol. XVII, pp. 418–422.

GOVERNMENT. The constitution vests the legislative power in a Parliament of two houses, the first called the Legislative Council, and the second the Legislative Assembly. The Legislative Council consists of not less than 21 members (69 in 1901), appointed by the crown for life, and the Assembly of 125 members in 1901. The duration of a Parliament is not more than three years. By an act of Sept. 21, 1889, each member of the legislative assembly is paid $1,500 per annum. To be eligible or entitled to vote, a man must be of age, a native or naturalized subject of the British sovereign and have resided one year in the colony and three months in his electoral district before an election. The holder of real property in any constituency also is allowed to vote. The voting is taken by secret ballot. In 1898 there were 324,338 electors enrolled, or 24.28 per cent of the population. At the last general election, in 1898, 56.41 per cent of the electors on the roll voted. The executive is in the hands of a governor, appointed by the imperial government, who has a salary of $35,000. The governor is assisted by a cabinet of ten ministers.

AREA AND POPULATION. The area of the colony is 310,700 square miles. The estimated population, June 30, 1900, was 1,361,120. According to the census of 1891, of the total population only 73-100 of one per cent were aborigines, and the white persons born in the colony formed 64 per cent. The estimated population of Sydney, the capital, in 1900, was 451,000, including suburbs.

JUDICIARY. The legal business of the colony is under the Department of Justice, administered by the Minister of Justice, to whom the supreme, circuit and district courts are responsible. There is a supreme court, with a chief justice and six puisne judges. All prisoners charged with capital crimes are tried by a jury of twelve persons. Circuit courts are held at the principal towns in the colony twice a year. District courts are established for the trial of civil causes in which the amount claimed does not exceed $1,000. They are presided over by judges specially appointed, who also perform the duties of chairmen at quarter sessions, at which prisoners charged with other offenses than capital crimes are tried. In the metropolitan district, police courts are presided over by stipendiary magistrates; in the country districts, police magistrates and justices of the peace adjudicate. The licensing of houses for the sale of spirituous and fermented liquors is transacted by magistrates specially appointed for that purpose.

RELIGION. Since 1862 there has been no aid given to any church by the state. The principal denominations are Church of England, Roman Catholic, Presbyterian and Methodist. The Salvation Army has also a strong following.

EDUCATION. In 1880 state aid to denominational schools was abolished and instruction made compulsory, between the ages of 6 and 14 years; the children of the poor are educated free. There are not only primary public schools, but also high-schools for both sexes. There were, in 1900, 2,745 state schools, with an enrollment of 238,382 pupils and 5,063 teachers. The gross expenditure for the year was about $3,905,275. Of private schools there were 912, with 3,352 teachers and 60,327 pupils. Of these, 325 schools, with 1,617 teachers and 40,136 pupils, were Roman Catholic. The University of Sydney was founded in 1852, and its degrees in arts, law and medicine are recognized as on an equality with those of the United Kingdom. The Government grants a yearly subsidy of $60,000. The total revenue for 1900 was $183,775. There were 583 students attending during session, 1899–1900. There are 50 professors and lecturers. There is a free public library at Sydney, with 154,140 volumes in 1901. In addition there were 6 schools of a charitable character, with 26 teachers and 801 pupils.

FINANCE. The revenue for 1899–1900, arising from taxation, land revenue, and services (railway, postal, telegraph, etc.), was $49,800,000, while the expenditure aggregated $49,550,000. At the census of 1898 the estimated public wealth of the colony was $850,000,000, the estimated private wealth was $1,890,580,000, making the total wealth of the colony $2,739,107,500. The public debt of the colony, June 30, 1900, was about $325,000,000.

DEFENSE. In 1900 the land force of the colony comprised 9,231 men, of whom 726 formed the regular military force, and 8,505 volunteers, most of whom were partially paid. The naval force is composed of 614 men. The military expenditure of the colony in 1899–1900 was $1,300,000.

AGRICULTURE. In 1900 there were 2,440,968 acres, or a little less than one per cent of the area of the colony under cultivation. The cultivated land is principally to be found in small holdings of less than 500 acres. The area sold is not to exceed 200,000 acres annually, and the maximum area for purchasers is 640 acres.

In 1900, 1,426,166 acres sown to wheat produced 13,604,166 bushels; 214,697 acres planted with maize produced 5,976,022 bushels; 29,125 acres sown to oats produced 627,904 bushels. Sugar-cane was raised to the amount of 169,068 tons. Vineyards, with an area of 8,278 acres, produced 740,000 gallons of wine, 9,624 gallons of brandy, and 3,652 tons of table-fruit. The principal fruit-culture of the colony is that of the orange. There were in 1900, 14,533 acres in oranges, with an estimated production of 6,440,000 dozen. On Jan. 1, 1900, the colony had 36,213,514 sheep, 1,967,081 horned cattle, 482,200 horses, 239,973 pigs. In 1887 a forest conservation department was created, and attached

to one of the principal state departments. There are 1,084 state forests, covering 5,946,355 acres.

MINERAL PRODUCTION. The mineral products are many, and mining forms a very important industry. Gold, known in 1823, was worked first in 1851, near Bathurst. It is found over an area of 70,000 square miles, in granite, porphyry, diorite, quartz, breccias and alluvial deposits. Dry-blowing is employed by miners where water is scarce. Often gold is mixed with silver, copper, or tin, and the metal is worth, according to purity, from $18 to $20 an ounce. The output to the end of 1899 was about $245,000,000, that for 1899 being about $8,750,000. Silver, found at Boorook, Sunny Corner, etc., abounds in the Barrier Ranges near South Australia, at Silverton, Thackaringa, etc., where there are over four thousand miners. Discovered in 1883, in an almost rainless region, the silver area is 100 miles by 12. In 1899 the product of silver was 692,036 ounces, worth $384,565. Copper, first mined in 1858, yielded $1,975,870 in 1899, its ore being known to extend over 8,000 square miles. Tin, worked since 1872, from streams and lodes in granite, has fields of equal area, with a total 30 years' yield of $30,000,000. Lead is chiefly obtained from silver mines. Antimony, manganese, bismuth, etc., are mined. Iron is abundant, but not profitable to work, owing to the cost of labor. Precious stones, as the diamond, emerald, zircon, sapphire, topaz, etc., occur in granite localities. Asbestos, zinc, mercury, cobalt and alum are exported. Graphite, kaolin, and building-stone enrich industry. Coal is the most valuable mineral of New South Wales. It extends over 24,000 square miles; $178,000,000 worth was mined during 1860–99. The yield for 1899 was about $6,625,000 from 4,597,028 tons. Kerosene shale, rich in the Blue Mountains, yielded 150 gallons crude oil per ton. Its product for one year was $383,335.

MANUFACTURES. The report of 1897 gives the number of factories of various classes as 3,003, employing 50,883 hands, with a capital invested in 1899 of $78,248,520.

IMPORTS AND EXPORTS. The imports for 1899 amounted to $128,000,000, and the exports to $142,000,000.

ROADS, RAILROADS, TELEGRAPH, ETC. In 1899 there were 16,932 miles of government roads formed, metaled, and graveled; 7,127 cleared and properly drained; also 7,988 miles of roads in municipalities.

The following are particulars of the railways in the colony, June 30, 1900: Lines open for traffic, 2,771 miles owned by the government, and 85 miles of private railways. The total amount of money expended on railway construction to June 30, 1900, was $192,385,000. The net earnings for the year 1899–1900 amounted to $7,060,000.

The tramways are the property of the government. There were on June 30, 1900, 71 miles open for traffic, the capital cost being $9,300,000.

In 1899 there were 1,626 post offices.

At the end of the year 1899 there were 35,673 miles of telegraph wire in operation, the cost of constructing which amounted to $5,200,000; and 945 stations.

BANKS. The bank assets of New South Wales amounted in 1899 to over $210,100,000, about four-fifths being discounts. The Savings Bank of New South Wales, established in 1832, of which the governor is president, in 1899 had 12 branches. There are also post-office savings banks. Both institutions in 1899 had 260,826 depositors, whose aggregate deposits amounted to $50,500,000, giving an average account of $200.

The colony controls 14 lighthouses, one of which, the Macquaerie, was the first south of the equator to employ electric lighting.

*NEWSPAPERS IN THE UNITED STATES, are periodical publications containing records of current events and items of public interest, and are issued at regular intervals, i.e., daily, semi-weekly, weekly, etc. (For the origin and early history of newspapers, see NEWSPAPERS, Vol. XVII, pp. 422–449.) Periodicals devoted to the dissemination of news in its various forms are more properly called newspapers, as they publish the most important happenings in the various walks of business, social and religious life, with or without comment. They also include in their columns advertisements of the various articles of trade and commerce of the country in which they are published, as well as many from foreign parts. The great "art of journalism" is to be first in obtaining all legitimate news, first in accuracy and in the fairness in which it is stated, and first in securing the freshest, brightest and most picturesque features for the general reader. These are some of the requirements of the modern newspaper. There should be, in addition to this, a sound moral force underlying all the editorial comment,—a force that first and above all is American, believes in our institutions, is in favor of our Constitution and the Declaration of Independence, and that never forgets that the flag of the Republic must ever be regarded as the symbol of a government that has for its fundamental principles equality, fraternity and liberty.

It is only within a comparatively few years that practically all the people read newspapers. But a decade ago it was considered a luxury not to be indulged to subscribe for a daily paper, except in cities and large towns. Newspapers were then for the classes, and the classes that habitually read daily prints were people chiefly interested in the large affairs of life; in the dignified, the moral, the esthetic side of life. It was then not only easy for the newspapers to observe all the proprieties and exclude everything that savored of sensation, but it was necessary for them to do so.

It is different now. Newspapers have spread over the whole world. Everybody reads them. Where one copy was sold a quarter of a century ago, thousands now go out among the people. No one is too poor, none live too remote, to have a daily newspaper. They must now be made for the masses instead of for the classes, and they must be made as the masses want them made.

A newspaper must stand for something: if it stands for business alone, the world will know it; if it stands for character and principle, for purity in public and private life, for honesty and fairness in our relations with our fellow-men, the newspaper is

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an educating power for good in all that makes men and women better. If a newspaper stands for nothing but success, gained at whatever cost, its influence as an educator will be a cipher. If an editor is indifferent as to whether the world grows better, his newspaper must reflect that spirit. If he has faith in humanity, in the power of human love to make this life look bright and cheerful, unconsciously he will mold his editorial words to deepen and broaden that faith.

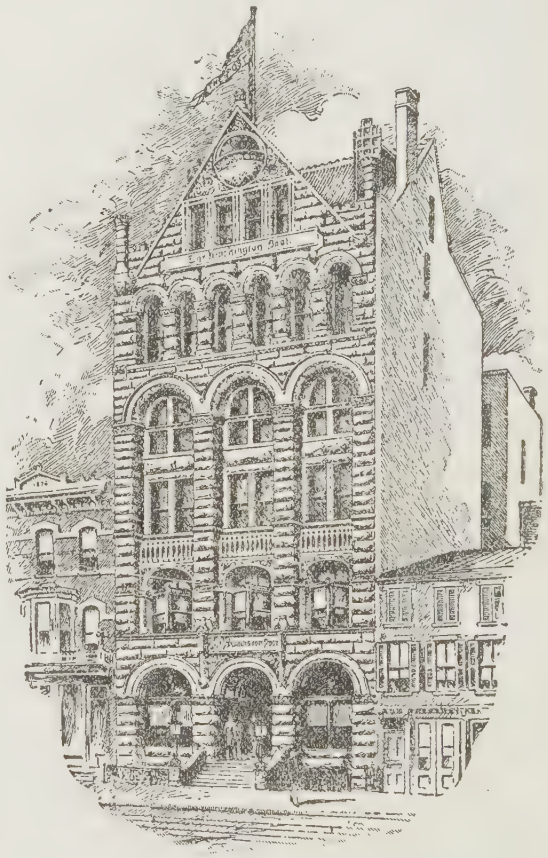
Primarily, the publication of a newspaper is a business enterprise. The world recognizes and applauds success. Self-preservation requires that the editor and his family shall be fed and clothed, and happiness must come in this way. But there are successful newspapers—in the conduct of which sensation is held to be enterprise—which we do not wish to admit to our homes.

American newspapers are improving. The number of those which resort more to argument and less to vilification and abuse is increasing. As intelligence becomes more widespread, the moral character of American newspapers improves. The most influential newspaper in any American field to-day is the one that is run upon the highest intellectual and moral plane, the one that uses the best sense and the best morals. Gradually the paper that is guided by no moral or political principle is losing its hold. It is dropping to the rear. The best paper in every field—the paper with a moral purpose—is forging ahead and leaving the time-serving, characterless sheet in the rear, where it of right belongs.

There is but one other desideratum of a perfect newspaper, and that is, that it should give all the news. To do this the news journal must also contain advertisements. These are news, the freshest, the most constantly varied, the most interesting news of all. Without advertisements successful newspapers would be impossible and they would perish from the earth. By their means all can learn where best and cheapest to supply their wants, and by advertisements all can make their wants known. It is the task of the journalist to furnish his readers with a paper which shall combine the double functions of a narrator of the story of the world from day to day and of an epitome of commercial information. To render his paper an acceptable medium to the public who want to sell or to buy, the journalist must offer the advantage of an extensive circulation. To obtain this circulation he must provide the news-seeking public with the best and fullest information gathered from every corner of the earth. The gathering and publishing of news is an expensive process, but for this the advertising columns furnish the "sinews of war." The first-class newspaper attracts the first-class advertisements; the advertisements, in a large measure, enable the publisher to create and maintain the first-class newspaper.

The methods of gathering news for the great commercial dailies or the country weeklies vary only in degree. The publications of the larger cities require a corps of writers whose duty it is to cover all departments of news which may be of interest to the reading public. The possibilities, therefore, of city journalism are almost unlimited; while in the smaller cities the opportunities for enterprise are somewhat restricted.

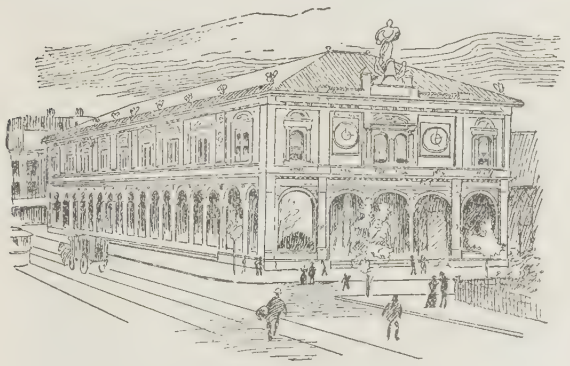
In the making of a metropolitan daily there are certain positions which are allotted to specialists, and these, in a measure, become fixtures on the papers with which they are identified. The person upon whom supreme responsibility rests in a daily newspaper office is generally known as the editor-in-chief. He represents more directly the publisher or the proprietors of the newspaper than does any other individual. It is his duty to see that the paper conforms to the general policy decided upon by the owners of the paper, and that the proper persons are employed to carry out these instructions. Next in importance is the managing editor, upon whom the real labor of getting out a newspaper devolves. He has the selection, in almost all cases, of the personnel of editorial writers, city editor, exchange editor, and the many other assistants which vary considerably in different newspaper offices. It is customary, among the larger metropolitan dailies, to hold daily conferences, during which the views of the more important representatives of the paper are presented, public matters discussed and a general policy outlined, which then is followed out as nearly as possible by the subordinates.



"WASHINGTON POST" BUILDING.

The city editor is vested with the control of the "local" or city staff—reporters who gather and write what is known as "the local news," which includes

nearly everything that is printed in the paper that does not come by telegraph or appear on the editorial page. These reporters are given definite assignments throughout the day, and go from their respective offices with a fixed object to accomplish, and are not sent out on a roving commission to see what they can find, as has popularly been supposed. The work of gathering city news has been simplified greatly during the last 15 years by the establishment of local city press associations, to cover what is known as routine news, i. e. the courts, police, hospitals and other headquarters where news is to be obtained daily by keeping a close watch on public affairs and awaiting new developments. On important papers there is a day city editor and a night one. There are office men also to read copy, prepare headings and keep a schedule. Reportorial work is divided according to the amount of news going. The city editor enters on his assignment-book, days and weeks in advance, all regular meetings of civic bodies, clubs and organizations of which he can obtain knowledge, and deputes reporters to attend to them. The court reporters spend the day



"NEW YORK HERALD" BUILDING.

at the courts, prepare the records and report all cases of importance. Men are detailed specially for trials, for the city council, the county board and other municipal centers. One man attends to all routine railroad matters, another to the lake, river or ocean marine.

The telegraph editor on a newspaper has the responsibility of caring for all of the news matter which comes over the wires into the newspaper office, whether it be from press associations or from special correspondents throughout the country. These special correspondents represent the newspaper with which they are identified, in the cities in which they live, and are paid, in most instances, for the amount of news they furnish from week to week or month to month. In cases of news of supreme importance, it is customary for newspapers to send special representatives from headquarters to other cities, they making a report for their individual paper of the event which they are assigned to cover. This may be a cyclone horror, a national convention, a great fire in another city, a railroad wreck, a political gathering, or may be for the purpose of getting more complete details on some subject which the particular paper upon which the correspondent is engaged is interested.

Of other departments of a newspaper, the more important not yet mentioned are those of the exchange and news editors. The exchange editor is generally a man of considerable experience, and his work is to select from the "exchanges" all kinds of matter for use by the various departments. He clips horse and baseball, and similar notes for the sporting-editor; notices of change of pastorates for the religious column; musical and dramatic gossip, short stories, matters relating to local celebrities, important news items of which only brief mention has been made in the telegraph columns, etc. The news editor takes care of news items, and in most cases has control of the out-of-town correspondents. Most newspapers make a feature of treating exhaustively sporting-matters in their various forms, the drama, household affairs, insurance and banking, trade and financial reviews, and real estate. These subjects are handled by specialists, who devote a large portion of their time to familiarizing themselves with the news features of their particular department. There is a musical and dramatic critic on nearly all newspapers, and on some a religious editor is maintained, while the doings of secret societies and benevolent organizations form a department of many of them, and others make a specialty of reporting labor movements.

Once the news of the day has been gathered into the newspaper office, in various forms, the process of editing then begins. This work is done by professionals, who are experts in preparing "copy" for the printer. The copy thus prepared is then turned over to the foreman of the composing-room, whose duty it is to see that the manuscript which comes into his hands is put into type; and this, after proofs have been taken, is carefully read by proof-readers who compare the proofs of the compositors' work with the original manuscript, and mark for correction any errors that may be discovered in the process of type-setting. This step being accomplished, the corrected type is then placed in galleys and taken to an imposing-stone, where it is deposited. It is then ready for "making-up" into the form in which it will appear in the newspaper. In this work of "making-up," all matter relating to the different departments is kept separate; and, when the work of arranging the type is completed, the pages are then full and are "locked up" ready for the forms to be sent to the stereotyping-room. Great improvement has been effected in the process of duplicating the types, so that it is not necessary to print newspapers direct from the type. Instead, *papier-maché* matrices are now made, which serve as molds, and from these a casting is made in exact duplicate of the original type; from this casting the newspaper is printed. These metal plates can be duplicated in quantities, and thus a large edition can be run from extra sets, so that within a short time fifty to one hundred thousand copies of a newspaper may be printed and ready for distribution through the various channels through which newspapers are circulated.

In the mechanical economy of making the modern newspaper much saving in the cost of production has been made by the recent adoption of type-set-

ting machines, which reduce the cost of composition about fifty per cent. These machines are rapidly taking the place of hand-labor, especially in the larger cities. Some opposition on the part of labor-unions followed their initial introduction; but this has been removed by a rule which requires the machine-operators to become members of the typographical unions in the cities in which the operators work, and by the adoption of a fixed scale of prices.

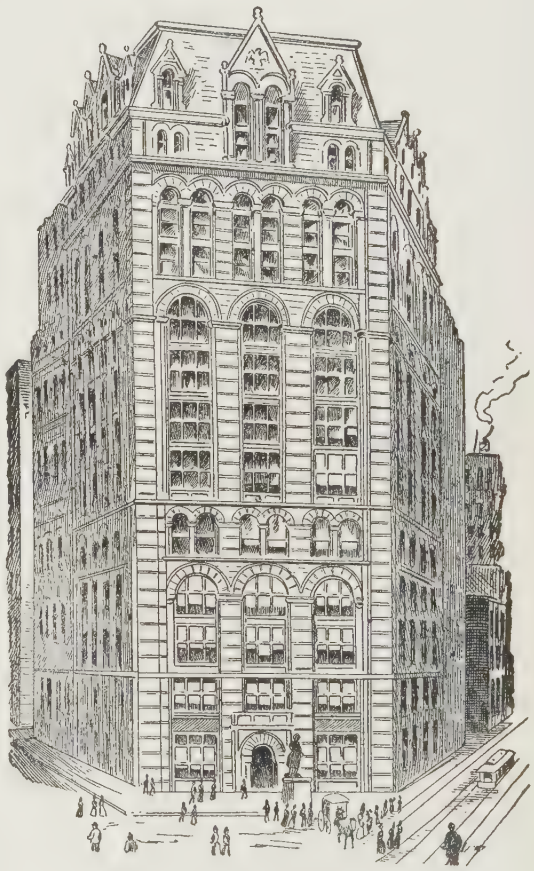
Newspapers are circulated through the mails as second-class mail matter, and postage is charged at the rate of one cent a pound. Under the present postal regulations, however, copies of a publication issued less frequently than once a week, addressed to a person residing in the city in which it is published, must be prepaid by stamps, at the rate of a cent for four ounces or four cents a pound. The weeklies and dailies go through the mails at a regular pound rate without the affixing of stamps, bills being rendered by the postal authorities and settlements made weekly or monthly according to the frequency of the publication.

Newspapers frequently vary in size (number of pages) from day to day, according to the volume of news and the pressure of advertisers for space. It is the common custom to adjust the size of a newspaper to meet the requirements of the advertising columns, and when the advertising patronage is light the size of the newspaper is reduced in accordance and the news made to suit these conditions, unless news matters of unusual importance are before the public, in which event the question of the advertising patronage cuts little or no figure with the publisher or editor of the paper. In addition to the regular issues, many newspapers, especially those issued in the evening, get out "extras," in which the more important and later news features are displayed prominently, and which, in many cases, have a large sale; especially is this so where some event of unusual importance is chronicled. In addition to these extras, many newspapers have special editions, some to emphasize the importance to their readers, and those whom they seek to become such, of their particular paper and its desire to cater to the reader's special wants.

Illustrations now form a most important part in the make-up of a complete newspaper. While there are a great many publications which do not use cuts to illustrate their news and other features, the majority of them do so, and the number is increasing rapidly. Some newspapers do not go beyond the use of portraits of prominent personages; others illustrate every article possible. These illustrations are made by what is known as the zinc-etching process, the original of the picture being drawn with pen and ink and reproduced by photography on glass and then transferred to metal. Chalk-plates, formerly in common use, are used but little now.

The growth of the Sunday newspaper has been very rapid during recent years, and has reached abnormal proportions. It is not an unusual occurrence for a metropolitan daily to issue more than fifty pages on Sunday. The presence and rapid growth of these Sunday newspapers has brought some antagonism from the religious element, who have declared that the Sunday papers "rob the employees of newspaper offices of their Sunday rest." It is a fact, however, that the work of preparing a Sunday newspaper begins early in the week, and is almost finished when Sunday begins. The effect of the circulation of newspapers on Sunday is quite another issue, and one which can be defended less successfully.

Another important change in the making of newspapers has been the recent reduction in price. Practically, the day of the five-cent newspaper is past, one cent being the prevailing price now



"NEW YORK TIMES" BUILDING.

charged for morning and evening papers. This change has already taken its course westward, until now the Pacific Slope has been reached and penny newspapers are increasing rapidly in California, where a few years ago no coin whatever of less value than five cents was in circulation.

The country newspaper of to-day is vastly superior to that of a few years ago, on account of the introduction of what is known as "plate-matter" and "patent insides." The former is prepared in large cities by concerns generally known as newspaper unions, who make a business of editing and compiling late news matter from the metropolitan dailies, putting it into plate form, column width, and forwarding the plates to their various subscribers, who are

generally publishers of papers of small circulation. These plates, when received, are arranged according to the peculiarities and make-up of the particular papers receiving them, and are used in lieu of type set at place of publication. "Patent insides," so called, are sheets printed on one side only, local matter being set and printed at the office of publication. By these methods of securing news small country publishers are enabled to have the benefit of the exchanges of the world, and at a less expense than the composition alone would amount to if prepared in their own offices.

The rapid growth and phenomenal success of a number of American newspapers has caused many of

"NEW YORK TRIBUNE" BUILDING.

them to invest their surplus capital in handsome fireproof buildings, which in most cases are used for general office purposes, as well as for the home of the newspaper. These huge structures in many cases represent the highest skill in the builder's art, and are a desirable addition to the architectural beauties of the cities in which they are located. Among the more prominent of these buildings are the New York *Herald*, *Times*, *World*, *Tribune*, *Mail and Express*, Washington *Post*, Chicago *Herald*, St. Paul *Globe*, San Francisco *Chronicle*, Seattle *Post-Intelligencer*, and Portland *Oregonian*.

What is known as the "business office" of a newspaper is that portion of the publication which has more directly to do with the actual publication of a newspaper. In each newspaper office there is what is generally known as a "business manager," whose duty it is to make contracts with advertisers, purchase the necessary supplies with which to publish the newspaper, see that proper accounts are kept, including records of the circulation, etc., and that the employees are paid their salaries. While the two departments, business and editorial, of a newspaper, are working to the same end, i.e., the successful publication of a newspaper according to the ideas of the owners, they are sometimes in conflict and not infrequently the cause of more or less contention as to the individual rights of each; but probably no more so than occurs in other large establishments devoted to mercantile pursuits.

Another form of supplying reading-matter to American newspapers is by the syndicate system. The persons conducting these syndicates make arrangements with authors and specialists in certain lines for signed articles. These are re-sold to the newspapers—one only in a city—and generally are published simultaneously. By this plan one paper in each city is often able to secure an article of unusual merit, and from the pens of eminent persons, at a nominal figure, sometimes as low as one dollar and a half a column, whereas, if they contracted directly with the author, they would be compelled to pay many times the cost. By selling the same article to different newspapers, a large profit is sometimes made in this way by the newspaper syndicates, which are growing in number and importance. Some writers syndicate their work direct without the aid of the middleman.

The aggressiveness of some newspapers has caused a frequency of libel suits, out of which has grown various libel laws, good, bad and indifferent. The frequent attempts of lawmakers to "muzzle the press" have not met with the success of former days; and although the efforts of the class most interested in curbing the spirit of the press and curtailing its liberties are not less frequent on account of failure, they are getting perceptibly weaker and shorter in scope. Of course there are instances—and no one regrets the fact more than the newspaper men themselves—in which flagrant violations of good sense in printing the news occurs; but these exceptions are not common, and the spirit in which they are met and denounced by other newspapers generally acts as a preventive of their recurrence.

Efforts have been made, from time to time, to adopt the custom of printing the signature of the writers who contribute to the daily press, but no great success has been attained in this direction, except in occasional instances. Signed articles have, however, had a tendency to secure for the publisher critical and technically correct contributions from specialists, which are deemed more able and worthy of attention than those supplied by the average editor, who is an expert in no profession, and yet must write of them all. It is hardly possible that the system of signed articles, even if adopted, will be carried so far that the publisher may avoid the responsibility for libel suits for the statements made in signed articles; and yet this has been discussed as a possibility. While the plan has many advantages, as well as drawbacks, the signed article in the newspaper is becoming more and more familiar, and marks another departure in modern journal-

ism; and in so far as it secures better and more careful—that is to say, more responsible—work, it is to be commended.

Newspaper writers are now measured according to their merits, and the measure is taken very swiftly, whether the individual be man or woman. Women are succeeding, and have succeeded, in every branch of journalism, from the mere setting of the type to the absolute control of a great publication. Men as a class are apt to employ slang, colloquialisms, technical phrases and business language. Women, on the other hand, seldom fall into these errors, but sin on the side of brilliant rhetoric and so-called "fine writing." They have a natural inclination toward qualifying things that they like with pretty words: a girl is always "pretty" or "charming"; a gown "elegant" or "lovely"; a book "delightful" or "splendid." As between the two faults, the woman's is less objectionable. Few newspaper women care to report fights, accidents, or other facts involving shame, suffering or disgrace; men, on the other hand, have a natural aversion to spending much time upon details. They are much quicker, however, to perceive news and to secure it. The practice known as "faking" is not uncommon with newspaper men, but is very rare with newspaper women. The feeling between the two sexes is very amicable, each recognizing where the other can do better work. The great increase of newspaper women is due, not to any competition between men and women, but to the fact that the development of the modern newspaper necessitates the gathering of news where women are more qualified to act than men. This kind of news includes the description of social events, interviews with distinguished women, women's clubs, women's colleges, women's industries, and women's work in art, literature and music. A few of the larger dailies have women employed as editorial writers, and in one or two instances they have attained remarkable success in this line of work, although the tendency of their thoughts and inclinations is generally to lighter veins.

Attempts have been made from time to time to establish schools of journalism, but without signal success. Joseph Medill, the distinguished editor of the Chicago *Tribune*, has said: "You will not go far astray if you lay down as your major postulate that the real journalist, like the real poet, must be born, and cannot be made by art." Very few of the more prominent newspaper editors are believers in schools of journalism, and think it would be a mistake to establish them in connection with universities and colleges. As has been well said by Colonel Charles H. Jones, of St. Louis: "That man is best equipped for the work of journalism who knows most of what is taught in all the schools. The best education for a journalist is the mental training which he gets from the widest possible range of studies in the colleges or universities—I mean the widest range of studies that he can really master; and after he has equipped himself with all the knowledge that can be obtained from this general curriculum, he will find it necessary, as soon as he begins the practical work of journalism, to widen his knowledge and enlarge his range of information in all possible ways."

To be a successful journalist, a man must have what is technically known in the profession as "a nose for news." Without this he cannot succeed with the best education that it is possible to give him.

Friendship for newspaper men has long been held to be a necessity in ratio to the success of the individual who follows a public career. Chauncey M. Depew is a brilliant example of the class of men who are most accessible to reporters. It is said that Mr. Depew sees more newspaper men, and oftener, than any other recognized prominent person in the metropolis of New York; they breakfast, dine and sup with him, or rather, that is what it

"PORTLAND OREGONIAN" BUILDING.

amounts to. He has been called "the reporter's best friend." Russell Sage was formerly as accessible to reporters and the general public as is Dr. Depew, but since the Norcross incident has been of a more exclusive and retiring disposition.

Incomes of newspapers are difficult to get at. Vast fortunes have been made and lost in the launching of newspapers; as much as half a million dollars has been expended within a year or two in the building-up of a newspaper which has proved a failure, while much less sums judiciously expended have produced publications which have been successful from the start, and in many instances have brought their founders immense fortunes in a few years. The general impression is, that the most of the income of newspapers is from advertising; but according to the recent census the revenue is about equally balanced. The census figures are as follows:

From advertising, $71,243,087; from circulation, $72,343,361; the slight difference being in favor of the subscribers. The number of copies of newspapers printed during a year in the United States has reached the marvelous total of 4,681,113,530, and this is an increase of 2,600,000,000 over the figures obtained by the census of 1880. In the six years since the eleventh census was taken, the increase went on, and it is safe to say that the total of six thousand million has been passed. It is impossible to grasp all that this means. Perhaps the best illustration is, that if one person were invested with enough life, and were to give twelve hours a day to constant reading, he would be five or six thousand years old before he got through the papers and periodicals printed in the United States in a year.

The following table gives the number of newspapers and other publications that are known to have been issued in this country since 1869:

	Daily.	Triweekly.	Semiweekly.	Weekly.	Biweekly and Semi-monthly.	Monthly.	Bimonthly.	Quarterly.	Total.
1869	519	120	91	3,912	79	459	7	32	5,219
1870	574	107	115	4,295	96	622	13	49	5,871
1871	594	105	112	4,380	116	677	13	59	6,056
1872	525	107	113	4,808	113	690	4	55	6,519
1873	647	96	101	5,175	110	678	9	59	6,875
1874	678	83	92	5,554	120	744	11	57	7,339
1875	718	80	107	5,957	130	802	8	68	7,870
1876	738	70	121	6,235	138	747	13	67	8,129
1877	709	60	115	6,221	129	664	13	57	7,958
1878	729	59	120	6,540	114	708	15	55	8,340
1879	742	60	121	6,847	131	732	17	53	8,703
1880	845	58	129	7,590	166	868	14	55	9,723
1881	921	56	116	7,955	170	969	14	66	10,267
1882	996	51	120	8,183	200	976	14	71	10,611
1883	1,062	50	122	8,635	222	1,034	12	59	11,196
1884	1,178	43	142	9,492	290	1,427	23	76	12,671
1885	1,183	39	139	10,082	292	1,604	33	122	13,494
1886	1,216	41	152	10,685	313	1,603	26	124	14,160
1887	1,311	39	165	11,116	285	1,655	30	105	14,706
1888	1,423	42	177	11,785	290	1,704	25	109	15,555
1889	1,494	36	207	12,234	289	1,898	36	125	16,319
1890	1,536	29	202	12,603	342	2,076	37	123	16,948
1891	1,700	39	221	13,420	397	2,506	75	178	18,536
1892	1,759	33	209	13,404	307	2,754	56	192	18,714
1893	1,855	31	237	14,017	434	3,125	78	229	20,006
1894	1,942	32	246	14,662	379	2,639	70	199	20,169
1895	2,050	40	321	14,685	385	2,676	55	183	20,395
1896	2,205	43	394	14,614	431	2,723	58	162	20,630

From this table it will be seen that during the year 1896 there were 20,630 publications of various kinds issued. This is only 235 greater than was the issue for 1895. Dailies increased about seven per cent, tri-weeklies nearly ten per cent and semi-weeklies nearly twenty per cent. There was some slight increase in the number of bi-weeklies, semi-monthlies, monthlies and bi-monthlies. Quarterlies, semi-quarterlies and tri-monthlies fell off in number, and for the first time in nearly thirty years the number of weekly papers was smaller than for the preceding year. This decrease is due to the inroads which the cheap daily papers are making.

The table on following page shows the number and frequency of issue of newspapers and periodicals published in the United States, Dominion of Canada and Newfoundland during the year 1896.

To give their readers all the news of the world, the great newspapers of the United States now rely upon special news-gatherers in every news-center of the globe. Many of the noted journalists of the country are connected with these agencies, which distribute vast quantities of news to American papers. The phenomenal progress and success of the American newspaper can, in a large measure, be attributed to the methods of these news-gathering agencies, foremost among which is the "Associated Press." Its close identification with the newspapers of America for the past decade or more, and its history, is in a large measure the history of journalism in America. Without these news-gathering aids it would not be possible, even in this day of rapid news-distribution, with the mechanical perfection that has been attained in this profession, to print as complete newspapers from day to day as are now to be found in all large cities. A brief outline history, therefore, of the inception and growth of the Associated Press should be of interest to those who desire a more complete knowledge of American newspapers, and especially of their development.

Between the years 1835 and 1840, and before the Atlantic cable and telegraph were in use, the New York papers established "pony expresses" and similar means to get the news from Washington, which was then, as now, a great news-center. They also established a line of small, fast-sailing boats to run out and meet the incoming foreign sailing-vessels. Then when the telegraph came into use they enlarged that field somewhat. The New York papers rather monopolized this news-gathering feature of the business in the beginning. The New York *Herald*, New York *Sun*, Philadelphia *Public Ledger* and Baltimore *Sun* all were established about the same time—1835. The Philadelphia *Public Ledger* was established by people who left the New York *Sun;* so was the Baltimore *Sun;* and then the Albany papers came into existence. Finally, these outside papers went to New York and said: "We wish to use this news you are gathering, and we will pay for it; fix a price, and we will pay for it delivered at our office over the telegraph-wires." The New York papers assented to the arrangement, and established relations with these interior papers conditioned upon the interior papers' paying them a fixed charge per week, and also furnishing the news of their immediate vicinage in exchange. That was the way the Associated Press began, and has continued to grow into the great news-gathering organization that it now is. The New York papers then were serving papers in New England, in New York state, Pennsylvania, and in the West. As the business enlarged, the New England papers decided to organize an association called the New England Associated Press. It was a distinct body, and, instead of making individual contracts, made a contract as an organization with the New York papers. Then the New York papers organized themselves into an association called the New York Associated Press, and established their own agent or manager. Under their rules, all of the news that the New York *Herald*, the New York *Sun*

	Daily.	Triweekly.	Semiweekly.	Weekly.	Trimonthly.	Biweekly.	Semimonthly.	Monthly.	Semi-quarterly.	Bimonthly.	Quarterly.	Total.
Alabama	20	--	4	167	--	3	3	15	--	--	----	212
Alaska	---	--	--	3	--	--	--	1	--	--	----	4
Arizona	10	--	--	35	--	--	--	1	--	--	----	46
Arkansas	26	--	1	198	--	--	5	18	--	--	2	250
California	113	1	9	450	--	5	9	87	--	--	----	674
Colorado	38	--	3	217	--	--	2	26	--	--	----	286
Connecticut	51	--	5	108	--	1	9	35	--	3	7	219
Delaware	5	--	--	28	--	--	1	4	--	--	----	38
District of Columbia	5	--	--	30	--	--	2	25	1	2	3	68
Florida	16	--	3	104	--	1	4	11	--	--	----	139
Georgia	28	--	2	252	--	--	6	38	--	--	1	327
Idaho	3	--	3	54	--	--	1	3	--	--	----	64
Illinois	162	2	29	1,060	1	7	36	252	1	5	16	1,571
Indian Territory	3	--	--	46	--	--	--	1	--	--	----	50
Indiana	137	--	16	575	--	--	10	78	--	1	1	819
Iowa	75	3	24	839	--	1	9	76	--	1	6	1,034
Kansas	48	--	7	567	--	1	7	63	--	1	2	696
Kentucky	29	1	13	214	--	3	7	32	--	--	1	300
Louisiana	18	--	2	145	--	--	4	10	--	--	----	179
Maine	18	--	2	113	--	1	4	47	--	--	7	192
Maryland	16	--	2	139	--	2	2	38	--	--	5	204
Massachusetts	88	--	7	325	--	7	10	166	1	2	21	627
Michigan	68	1	14	581	--	4	12	78	--	3	1	762
Minnesota	38	--	2	442	1	4	15	45	--	1	1	549
Mississippi	9	2	4	152	--	--	6	12	--	--	----	185
Missouri	87	2	14	709	--	5	16	117	--	3	8	961
Montana	13	1	2	73	--	--	1	6	--	--	----	96
Nebraska	32	1	7	501	--	1	7	33	--	--	1	583
Nevada	9	--	2	14	--	--	1	----	--	--	----	26
New Hampshire	15	1	1	80	--	--	--	13	--	--	1	111
New Jersey	47	1	2	277	--	3	9	49	--	3	2	393
New Mexico	5	1	1	43	--	--	--	3	--	--	----	53
New York	183	3	46	1,080	--	13	39	530	--	15	41	1,950
North Carolina	21	--	2	166	--	--	9	19	--	--	1	218
North Dakota	9	--	--	118	--	--	1	8	--	--	----	136
Ohio	158	7	36	766	--	4	16	142	--	2	13	1,144
Oklahoma	11	--	1	79	--	--	1	9	--	--	----	101
Oregon	18	--	8	139	--	--	2	20	--	--	1	188
Pennsylvania	200	4	34	899	1	7	21	239	--	7	10	1,422
Rhode Island	16	--	3	40	--	3	--	11	--	1	1	75
South Carolina	10	1	10	92	--	--	5	4	--	1	----	123
South Dakota	26	1	3	210	--	1	1	15	--	--	----	257
Tennessee	19	--	7	213	--	2	3	37	--	--	1	282
Texas	64	1	12	575	--	1	3	41	--	--	1	698
Utah	8	1	7	41	--	--	3	6	--	--	----	66
Vermont	4	--	1	66	--	--	1	13	--	--	----	85
Virginia	31	3	5	178	--	--	2	42	--	1	4	266
Washington	18	2	2	171	--	1	4	24	--	--	1	223
West Virginia	15	--	3	134	--	1	1	15	--	--	----	169
Wisconsin	63	--	5	486	--	4	6	40	--	1	1	606
Wyoming	4	--	1	28	--	--	--	----	--	--	----	33
Total United States	2,110	40	367	14,022	3	87	316	2,598	3	53	161	19,760
British Columbia	6	--	3	15	--	--	2	1	--	--	----	27
Manitoba	3	--	2	32	--	--	--	10	--	1	1	49
New Brunswick	8	--	2	28	--	--	1	5	--	--	----	44
Northwest Territories	2	--	2	17	--	--	--	--	--	--	----	21
Nova Scotia	8	2	3	48	--	1	1	5	--	--	----	68
Ontario	47	--	8	364	--	3	10	80	--	--	----	512
Prince Edward Island	3	--	2	11	--	--	--	--	--	--	----	16
Quebec	16	1	4	75	--	2	5	24	--	1	----	128
Total Canada	93	3	26	590	--	6	19	125	--	2	1	865
Newfoundland	2	--	1	2	--	--	--	--	--	--	----	
Grand total (1896)	2,205	43	394	14,614	3	93	335	2,723	3	55	162	20,630

or New York *Tribune* got they turned into a common pool; in other words, they "pooled their news." One copy of a piece of news was dispatched to the *Herald* office, or *Sun* office, or *Tribune* office, as the case might be, and another copy of the same thing—a duplicate—would go to the New York Associated Press office, the several papers simply combining to use their special service to maintain an association. After making this contract with the New England Associated Press, the larger association made one with the New York State Associated Press, then with the Baltimore Associated Press, the Washington

Associated Press, and finally with the Western Associated Press.

Some years later, or about 1870, the Western Associated Press, principally, as well as some of these tributary associations, grew restive. They did not want to continue to be simply tributary to the New York association. There were two reasons for this: one was that the New York association controlled absolutely the character of the news to be gathered, and was selling this "pooled news" at a price that made their own cost them practically nothing. The tributary associations wanted not only a voice in the management, but they wanted the plan rearranged so that the New York papers would pay their proportion for gathering this news. In 1882, after some controversy, the Western Associated Press formally severed its relations with the New York association papers, put its own agents in London and in Washington, and began a competitive service. That competition lasted but a few weeks, when the New York Associated Press threw up its hands, and a compromise was effected by which the New York Associated Press and Western Associated Press entered into an alliance, the Eastern organization naming two members, the Western naming two, of a joint executive committee to control the details of the business. It was really an amalgamation of the two associations. A fifth man on this joint executive committee was taken from New York, while the general manager was taken from the West. That plan of working together continued for ten years.

Meanwhile a rival association had grown up, because one of the features of the Associated Press organization was that it was a close monopoly. No news could be served to any new paper in any town without the consent of the existing press papers in that town—the unanimous consent. Each Associated Press paper had a veto upon any new paper coming in. The result was, that every now and then new papers would be started without the Associated Press service; and enough of them grew into positions important enough to enable them to establish a rival association, which was called the "United Press." This organization had been started under three or four names; it was called at one time the American Associated Press, then the National Associated Press, and finally it developed into the United Press. Not only was this new association fostered by the fact that there were papers outside of the Associated Press which required service, and which were willing to help support it, but there were also a number of rival telegraph companies, like the Mutual Union, the Baltimore and Ohio, the Postal, and others. The Associated Press was identified closely with the Western Union. These other telegraph companies came into existence as rivals of the Western Union, and the cost of service over their lines was very cheap; consequently it was an easy matter to establish a cheap news-service, and small papers could afford to pay for it. But it still remained true that the Associated Press held a commanding place.

In 1887 the United Press made a secret agreement with the executive committee of the Associated Press, the result of which was a practical union of the two organizations. The Associated Press was in the nature of a co-operative organization; that is, its membership, particularly the Western Associated Press, extended to every paper of importance: they were all shareholders in it. The United Press was started originally on the same plan, and by the sale of stock in its treasury and by virtue of the arrangement made with the Associated Press, the United Press stock was soon in the hands of two or three men — that is, enough to control it absolutely — and they sold at a nominal price some of this stock to the executive committee of the Associated Press. It became a dividend-paying stock at once, for this reason: that the terms of the agreement between the United Press and the Associated Press provided that the Associated Press report should be given to the United Press in exchange for its report. The United Press then had no expense for gathering news, and was a money-making venture. This ran on until the truth was discovered, in 1891, and steps were taken to repudiate the arrangement. Then open warfare came on between the two organizations. Naturally, those members of the executive committee who were repudiated by their fellow-members went into the United Press and undertook to destroy the Associated Press. The struggle ended in the assignment of the United Press, March 29, 1897. The Western Associated Press was reorganized into the Associated Press, was made a national organization, and from 1893 it has gone on building itself up, until it is now in the normal position it held before the fight began.

This outline represents the relations of the Associated Press with the newspapers it serves in America. For the purpose of gathering foreign news it now has correspondence with the foreign news agents—the Reuter, Havas, Wolf, and the different agencies all over the world. It has contract relations with Reuter and Havas, which cover Great Britain and her colonies, France, Belgium, Switzerland, Portugal and some parts of South America; with the Wolf Agency of Berlin, which covers Germany, Austria and Hungary; with the Stefanie Agency, which covers Italy; with the Nordisches Telegram Bureau, which covers Russia; with the Norsky Telegram Bureau, which covers Norway; with the Svenska Telegram Bureau, which covers Sweden; and with the Agence de Constantinople, which covers Turkey. The way they operate is this: Take, for instance, the Stefanie Agency. It gathers all the news of Italy into Rome, and redistributes it to all the cities of Italy. Then it sends a budget of news—it may be 100 words or 500 words —to London, and also to Paris, and receives from each of these places a budget, which it in turn also distributes to the different cities of Italy. The Associated Press does the same. It has Walter Neef in London, and Count Wolf von Schierbrand in Berlin. All the news that comes into the Wolf Agency at Berlin, Von Schierbrand sees, and makes up a budget and telegraphs it to London. Reuter gets his budget from his different European agencies, and Walter Neef and his staff look over Reuter's dispatches and send to America whatever may be of interest here. This in turn is sent out to

papers in the United States. On the other hand, Reuter has his agent in the New York Associated Press office, looking over its dispatches and sending to him whatever may be of interest to Europeans. By this means there is a perfect system of exchange of news by the Associated Press all over the world. It operates also with a system of leased wires that run all over the United States and to the City of Mexico. Then for Canada it has an exchange arrangement with the Canadian Pacific railway by which that company gathers all of the news on its line and delivers to the Associated Press at four points in this country—Bangor, Buffalo, Detroit and Seattle. And the association delivers its news to them at these points for use in Canada.

MELVILLE E. STONE.

NEWT, same as TRITON. See Vol. XXIII, p. 614.

NEW TIPPERARY. See HOME RULE, in these Supplements.

NEWTON, Illinois, a city and the county seat of Jasper County, in the southeastern part of the state. It lies on the Embarras River, 100 miles southeast of Springfield, and is reached by the Peoria, Decatur and Evansville and the Indiana and Illinois railroads. It is the center of an agricultural, dairying and coal-mining region. Its population in 1900 was 1,630. W.F.J.

NEWTON, Iowa, a city and the county seat of Jasper County, in the central part of the state. It lies in the farming region between Indian Creek and Skunk River, thirty miles east by north from Des Moines, and is reached by the Iowa Central and the Chicago, Rock Island and Pacific railroads. It is in an agricultural and horse-breeding country, and has considerable manufactures. Its population in 1900 was 3,682. W.F.J.

NEWTON, a city and the capital of Harvey County, central Kansas, 135 miles S.W. of Topeka, on the Atchison, Topeka and Santa Fé and the Missouri Pacific railroads; has a large carriage factory, flour-mills, planing-mills, and a machine factory. Valuable coal-mines and stone-quarries are in the vicinity; also a public library. Population 1890, 5,605; 1900, 6,208.

NEWTON, a city of Massachusetts. It has an electric street-railway to Boston via Boulevard, and to Waltham and Watertown; and on the Boston and Albany railroad. Newton Theological Seminary (Baptist) in 1901 had 8 instructors, 60 students, and a library of 24,000 volumes. The public library has 45,181 volumes. Population 1890, 24,379; 1900, 33,587. See also NEWTON, Vol. XVII, p. 449.

NEWTON, a town and the county seat of Sussex County, New Jersey, in the northern part of the state. It lies among the mountains, in a mining region, and has some manufacturing establishments. It is reached by the Lehigh and Hudson River railroad, and had in 1900 a population of 4,376. W.F.J.

NEWTON, a village and the capital of Catawba County, western North Carolina, 25 miles W. of Statesville and 24 miles N.N.W. of Charlotte, on the Western North Carolina, the Chester and Lenoir and the Southern railroads. It contains Catawba College (Reformed), a co-educational institution, founded in 1851, and having in 1901 10 instructors, 162 students, and a library containing 2,500 volumes. Population 1890, 1,038; 1900, 1,583.

NEWTON, ALFRED, a British ornithologist; born in Geneva, Switzerland, June 11, 1829. His parents were English, and he received his education in Magdalene College, Cambridge. He became professor of zoölogy and comparative anatomy in the University of Cambridge in 1866, and a recognized authority upon ornithology. He contributed the article on ORNITHOLOGY to this ENCYCLOPÆDIA, and numerous special articles on the various families of birds. Among his publications are *On the Zoölogy of Ancient Europe* (1862); *Zoölogy* (1875); he also edited Tunsall's *Ornithologia Britannica* (1880).

NEWTON, SIR CHARLES THOMAS, an English archæologist; born in Bredwardine, Herefordshire, in 1816. He was educated at Shrewsbury school and afterward at Christ's Church, Oxford. From 1840 to 1852 he was assistant in the Department of Antiquities in the British Museum which he then exchanged for the office of vice-consul at Mitylene, whither the possibilities of exploration attracted him. For seven years he prosecuted his researches on the coast of Asia Minor, and the results were the famous discoveries of the mausoleum and the sculptures at Halicarnassus, Cnidue and Branchidæ, which were acquired by the British Museum. He was appointed consul at Rome, June 10, 1859, which post he held until Jan. 16, 1861, when he resigned. He was then appointed head of the Department of Greek and Roman Antiquities in theBritish Museum. He was knighted in 1894 and died the same year, Nov. 28, at Westgate, England. W.M.C.

NEWTON, HUBERT ANSON, mathematician, was born at Sherburne, N. Y., on March 19, 1830, and was graduated from Yale College in 1850. Two years later, after pursuing a post-graduate course in mathematics, he became tutor and acting professor, and in 1855 professor of mathematics at Yale. There he remained for more than forty years, doing a monumental work as a geometrician and astronomer. His studies of meteors and their movements were of incalculable value to science. From his collation and analysis of data of the "November Showers" he demonstrated that the period of revolution of those clouds of meteors must have one of five ascertained values. He proceeded to establish the secular movement of the node of their mean orbit, and thus enabled others to connect the meteor streams with the comet of 1866. He demonstrated that most of the "shooting stars" move in orbits similar to those of the comets, especially comets of short periods. The results of his studies in these subjects were published in the *Memoirs of the National Academy* and in the *Journal of Science*, and he also contributed im-

portant articles thereon to several encyclopedias. In pure mathematics he wrote treatises on *Investigations on the Construction of Certain Curves by Points*, and *Certain Transcendent Curves*. He was instrumental in getting the metric system generally represented in American arithmetics. For some years he was an editor of the *Journal of Science*. He was a charter member of the National Academy of Sciences, and was president of the American Association for the Advancement of Science in 1885. He was a member of several learned societies in England. He died at New Haven, Conn., on August 12, 1896.

W.F.J.

NEWTON, JOHN, an American soldier; born in Norfolk, Virginia, August 24, 1823. In 1842 he was graduated from the United States Military Academy, second in his class, and commissioned a second lieutenant in the engineer corps. He served for three years as assistant professor of engineering at the United States Military Academy, and was then occupied with the construction of fortifications and river and harbor improvements on the Atlantic coast. He was promoted captain in 1856, and major in 1861. In the Civil War he received the rank of brigadier-general of volunteers. After the war various engineering duties, principally in connection with the harbor of New York, occupied his attention until his retirement on August 27, 1886. His greatest achievement was the removal of obstructions in Hell Gate Channel, an important waterway between Long Island Sound and East River. These, known as Hallett's Reef and Flood Rock, were duly mined and exploded on September 24, 1876, and October 10, 1885. He died in New York city, May 2, 1895. W.M.C.

GEN. JOHN NEWTON.

NEWTOWN, Connecticut, a town and borough of Fairfield County, in the southwestern part of the state. It has manufactories of vehicles and other articles, on the New York and New England and Housatonic railroads, and had in 1900 a population of 3,276. W.F.J.

NEWTOWN, Pennsylvania, a borough of Bucks County, in the southeast part of the state, on the Neshaminy River, eighteen miles north of Philadelphia and nine miles west of Trenton, N. J. It is in a farming and suburban residence region, is reached by the Philadelphia, Newtown and New York railroad, and had in 1900 a population of 1,463. W.F.J.

NEW ULM, a city and the capital of Brown County, central southern Minnesota, 28 miles W.N.W. of Mankato, on the Minnesota River, and on the Chicago and North-Western railroad; was destroyed in a raid and massacre by the Indians in 1862, and in 1881 was almost entirely destroyed by a cyclone; has iron, flour, sash and door, and other manufactures; is a trade center for a farming region. Population 1890, 3,741; 1900, 5,403.

NEW WESTMINSTER, a city of British Columbia, Canada, on the Fraser River, one of the termini of the Canadian Pacific railroad, 1,473 miles by rail W. of Winnipeg; has 12 feet of water in its harbor at ordinary high tide. Population 1891, 6,678; 1901, 6,499.

NEW YORK had a population, in 1890, of 5,997,853. That of 1880 was 5,082,871, the increase constituting a gain of 18 per cent. The rank among the states was first,—a position held since 1820. In 1900 the 12th census was taken which gave the population at 7,268,012. The density of population in 1900 was 152.61 to the square mile; that of 1890 was 126.74. The census reports of 1900 give 47 cities in the state with a population of 8,000 or more in which resided 4,980,042 persons, constituting 68.5 per cent of the entire number of inhabitants. In 1890 the number of cities of the population stated above was 46 in which resided 3,599,877 persons, 60.0 per cent of the residents of the state. The relative number of males and females in 1900 was 3,614,780 of the former and 3,654,114 of the latter. The native-born population at the time of the taking of the last decennial census was 73.9 per cent; the number of negroes 99,232,—an increase from 1890 of 29,140; the foreign-born citizens numbered 1,900,425. Of this latter class there were representatives of almost all nations of the earth. The Germans numbered 498,602, the Irish 483,375, the English 144,060, the Canadians 93,193, the Italians 64,141, the Russians 58,466, the Scotch 35,332, the Austrians 33,145, the Swedes 28,430, the Poles 22,718, the French 20,443, the Hungarians 15,598, the Bohemians 9,129, the Norwegians 8,602, the Dutch 8,366, the Welsh 8,108, the Danes 6,238, the Chinese 3,135.

New York has a total land area of 47,620 square miles, or 30,476,800 acres, of which 22,648,109 acres, or 74.3 per cent, are included in farms. The total acreage under cereals in 1899 was 3,125,079, or 10.63 per cent of the total land surface of the state, and the production in bushels 80,413,710. Of the whole area, 21.1 per cent was under corn, 17.8 under wheat, 42.5 under oats, 9.3 under barley, 5.7 under rye, and 9.3 under buckwheat. The acreage and product of the above-named crops is given below:

	ACRES.	BUSHELS.
Indian corn	658,652	20,024,865
Wheat	557,736	10,412,675
Oats	1,329,753	40,785,900
Barley	111,658	2,943,250
Rye	177,416	2,431,670
Buckwheat	289,862	3,815,350

During the period 1880 to 1890 the number of acres of meadow-land mown for hay was increased in New York by 598,558 acres; 48,954 horses were foaled; the average weight of fleeces sheared from sheep increased from 5.15 to 5.66 pounds; the num-

ber of milch cows was increased by 2,375, giving the state more milch cows than any other three states in the North Atlantic division; the number of neat cattle on farms was decreased by 208,364, —the largest loss of any state in the Union during the time, but leaving almost fifty cattle to each square mile of land surface; the average milk-production per cow during the period was 460.98 gallons,—the second highest production in the United States. New York stood high in the production of both flaxseed and fiber, ranking second in the av-

STATE SEAL OF NEW YORK.

erage value per acre of all flax products. In 1880 the state produced considerably more than one half of the total fiber raised in the United States. The highest average production of hemp to the acre in 1889, 1,192 pounds, was in New York, which stood second in the average value per acre, seventh in acreage, and fifth in production. In the area devoted to tobacco in the same year, New York stood eleventh, with 8,629 acres, and in production stood tenth, with 9,316,135 pounds raised. In the production of hops, New York led all the other states by far in the census reports of 1900, its hop acreage being more than seven times, its hop-production more than two and two fifths times, and the value of its hop crop more than two and three fifths times that of any other state. Below are given the relative statistics of farms, acreage, values and products for 1890 and 1900:

	1890.	1900.
Total number of farms	226,223	226,720
Average size of farms, acres	97	99
Total acres in farms	21,961,562	22,648,109
Total acres in farms, improved	16,389,380	15,599,986
Total acres in farms, unimproved	5,572,182	7,048,123
Total value of farms, fences, buildings, implements, machinery and live-stock	$1,139,310,716	$1,069,723,895
Total value of farm products	$161,593,009	$245,270,600
Number of horses	664,430	628,438
Number of mules and asses	4,636	3,651
Number of neat cattle	2,131,392	2,596,389
Number of swine	843,342	676,639
Number of sheep, excluding lambs	1,528,979	984,516
Pounds of wool shorn	6,715,686	6,674,165
Acres of meadow mown	5,243,010	5,154,965
Tons of hay harvested	6,675,658	6,389,496
Acres under Irish potatoes	357,464	395,640
Bushels produced	24,616,736	38,060,471
Acres devoted to hops	36,670	27,533
Pounds of hops produced	20,063,029	17,332,340
Pounds of broom corn produced	450,380	201,060
Bushels of pulse (peas and beans)	1,340,236	1,612,334

New York has stood first among the states since 1850 in the gross and net value of manufactured products, the average number of employees and the total wages paid. The total number of specified industries in 1900 was 78,658, the aggregate capital employed amounted to $1,651,210,220, the number of employees averaged 923,536, to whom annual wages amounting to $490,931,300 were paid, and the value of all products footed $2,175,726,900. Among the leading industries were clothing in al. branches, which approximated $234,000,000; all lines of boots and shoes, $26,000,000; furniture, all branches, $24,000,000; hosiery, $36,000,000; malt liquors, $56,000,000; petroleum-refining, $27,000,000; slaughtering and meat-packing, all branches, $57,431,000; tobacco and cigars, all branches, $53,660,000; all kinds of printing and publishing, $95,232,000; lumber in all forms, $45,500,000; leather in all forms, $23,000,000; foundry and machine-shop products, $97,000,000; flouring and grist-mill products, $42,796,340; chemical products, $40,663,363; patent medicines $17,075,937.

In the total value of the mineral products of 1899, New York stood sixth among the states, the output amounting to $24,165,206. The iron ore amounted in value to $3,100,216; all stone, to $4,418,143, which included granite, marble, slate, limestone, sandstone, bluestone, millstones, mica, and graphite. The petroleum product in 1900 in N. Y. was $27,184,524; with that of New Jersey and Pennsylvania, the value of the combined output of the three states was $91,811,690. In the production of salt, New York is second only to Michigan, the report for 1900 giving the number of establishments at 38, which is one-fourth of the whole number in the United States; the capital invested, $17,231,864, is more than one-half of the total amount invested in the entire country; the number of employees was 1,932, their total annual wages, $637,274; the value of the products for the year was $2,698,691, that of the United States being $7,966,897. Natural gas is largely used as a fuel for manufacturing purposes, and capital to the amount of almost one and one-half million dollars is invested in its production. Fully one-half of the cement made in the United States is manufactured in New York, the value of the annual product (lime and cement) amounting in 1900 to $6,188,342.

The timber-lands of the state were formerly very valuable, but great loss has resulted from waste and forest fires until the timber area is almost exclusively confined to the Adirondack region. The state forestry commission is doing much to preserve this district to the state, and legal protection has been thrown around the remaining forests of New York to a greater extent than in any other of the states.

The fishery interests of the state are of considerable magnitude, New York ranking fourth among the states in the census reports of 1890, the value of the catch of the preceding year being given at $3,798,815. The number of persons engaged in boat or coast fishing was reported at

1,626, the value of the catch approximating $1,000,000. The oyster-fisheries engaged 4,124 persons, and the value of the product was $1,765,088. The menhaden-fisheries gave employment to more than 1,000 persons, and the value of the products exceeded $600,000; in the shad and alewife fishery 1,190 persons were employed and $597,059 represented the value of the products; in the inland fisheries 587 persons were employed, and $82,412 was returned as the value of the products; the Great Lakes fisheries had 634 persons engaged, and yielded a return of $165,116, while many persons were engaged in and large returns came from cod and ground fishery, lobster-fishery and whale-fishery. Much attention is given to the fisheries of the state, and the legislature makes liberal appropriation for the distribution of fish and their protection. In 1894 a total of 134,000,000 fry were placed in the different waters of the state, and during the year ending Sept. 30, 1895, 196,247,840 fish of various kinds and ages were planted by the state. The kinds of fish distributed are many, including the brook, brown and rainbow trout, landlocked and sea salmon, maskalonge, black-bass, whitefish, pike, perch, tomcod, smelts, ciscoes, shads, bullheads, frost-fish and pike-perch.

Game is also protected by vigorously enforced laws, and has multiplied very rapidly within the period 1890–96. In the Adirondack region over 5,000 deer were reported killed in the open season of 1895.

The state taxes for 1895 were levied on a basis of a total valuation of $4,292,082,167. The total amount of property in the state was greater than the above sum by $111,693,960, corporate personal property not subject to taxation locally for state purposes. The total wealth of the state was divided as follows: Real estate, $3,841,582,748; personal property, $592,193,379.

The comptroller of the treasury reported on Oct. 1, 1900, that there was in the treasury the sum of $7,289,800; the receipts during the year from all sources amounted to $36,530,121, and the expenditures of the year amounted to $29,221,646. The balance on hand at the beginning of the fiscal year was $1,548,286, which, with the receipts of the year, sufficed to meet the expenditures and leave the balance in the treasury above mentioned,—the smallest balance remaining at the close of a fiscal year since 1890. The different corporations doing business within the state paid in during the year the sum of $1,855,975, which, with the organization taxes received, amounted to a total of $2,115,807. During the fiscal year 1,423 new corporations were formed, which paid in, as taxes, the total amount of $492,495.

The state charitable, reformatory and penal institutions of the state are many and well sustained. The asylums for the insane number eight, and are located at Utica, Poughkeepsie, Middletown, Buffalo, Willard, Binghamton, Ogdensburg and Rochester. The original cost of the buildings alone was $8,509,271. In 1895 the legislative appropriation for the care of the insane amounted to $4,292,082. At Syracuse is maintained an institution for the care of feeble-minded children, and at Newark one for feeble-minded women. The blind of the state are educated at institutions located in New York City and Batavia, and for the deaf and dumb there are six institutions, located at New York City, Buffalo, Rochester, Malone, Albany and Fordham. State prisons are maintained at Sing Sing, Auburn and Clinton; the average total number of convicts being about 4,000. At Auburn separate buildings are provided for women convicts, and reformatories are provided for women at Hudson and Albion. For men there are reformatories at Elmira, Canaan Four Corners, Randall's Island and Rochester. At Matteawan is located a hospital for insane criminals, at Bath is a soldiers' and sailors' home, and at Rome is located a state custodial asylum.

In 1895 the biennial school census of all the villages and cities of the state exceeding 10,000 in population showed a considerable increase over the preceding census. In 1900 there were 11,931 schoolhouses, and during the year following more than $4,000,000 was expended in building and repairs. The total number of persons of school age within the state was 1,932,295, of whom 1,208,855 belonged in the cities and 723,440 in the country. This was an increase of about 40,000 over the number in 1894. The total enrollment in 1900 was 1,569,653; average daily attendance 857,488. The total number of teachers in 1900 was 34,848, of whom 5,096 were males and 27,833 were females. In the cities of the state the teachers received, as salaries, $7,264,613, and in the country $4,788,404,—an increase over 1894 of $169,922. The estimated value of all school property (buildings, sites, apparatus and furniture) was approximately $81,768,895, divided among cities and country in the proportion of seven tenths to the former and three tenths to the latter. The expenditures for teachers' salaries (1900) amounted to $19,218,892; for buildings, sites, repairs, etc., $8,854,633; for school libraries $142,158. The total cost of secondary education in 1900 was $6,096,371 ($4,077,420 for high schools, and $2,018,953 for academies).

Teachers' institutes are held annually to the number of more than one hundred in various portions of the state, which are attended by an average of about 20,000 teachers. Normal schools are maintained at Buffalo, Courtland, Fredonia, Albany, Brockport, Geneseo, New Paltz, Oneonta, Oswego, Plattsburg and Potsdam, the aggregate attendance in 1895 being in excess of 8,000. The total value of the different properties is nearly $2,000,000, and the annual expenditures approximate $400,000.

The superintendent of public instruction, elected by the state legislature, is at the head of the common-school system of New York, under whose guidance work the superintendents in cities and commissioners over groups of towns. The regents of the University of the State of New York, elected by both houses of the legislature

on joint ballot, have supervision of education throughout the state. They supervise and control examinations, and have under their management the State Library and State Museum.

The following is a table of the denominational institutions of education conducted in New York, their location, and the religious organization under whose auspices they are operated:

Location.	Institution.	Religious Denomination.
Alfred.	Alfred University.	Seventh-DayBapt.
Allegany.	St. Bonaventure's Col.	Roman Catholic.
Annandale.	St Stephen's College.	Protes. Episcopal.
Brooklyn.	St. Francis College.	Roman Catholic.
Brooklyn.	St. John's College.	Roman Catholic.
Buffalo.	Canisius College.	Roman Catholic.
Canton.	St. Lawrence University.	Universalist.
Geneva.	Hobart College.	Protes. Episcopal.
Hamilton.	Colgate University	Baptist.
KeukaCollege	Keuka College.	Free Baptist.
New York.	Col. of St. Francis Xavier	Roman Catholic.
New York.	Manhattan College.	Roman Catholic.
New York.	St. John's College.	Roman Catholic.
Niagara Univ.	Niagara University.	Roman Catholic.
Rochester.	University of Rochester.	Baptist.
Syracuse.	Syracuse University.	Meth. Episcopal.

The following is a list of the non-sectarian institutions of the state:

Location.	Institution.
Brooklyn.	Polytechnic Institute of Brooklyn.
Clinton.	Hamilton College.
Ithaca.	Cornell University.
New York.	College of the City of New York.
New York.	Columbia University.*
New York.	University of the Cityof NewYork.
Schenectady	Union College.

The following are institutions for women only:

Location.	Institution.
Aurora.	Wells College.
Brooklyn.	Parker Collegiate Institute.
Elmira.	Elmira College.
New York.	Barnard College.
Poughkeepsie.	Vassar College.

In 1890 there were, in New York, 8,237 church organizations, 7,942 edifices, a membership of 2,171,822, which was 36.21 per cent of the population, and church property of the value of $140,123,008. In both membership and the value of church property the state ranks first, in number of edifices third, and in number of organizations fourth. The number of different denominations was 48, and there were 26 independent congregations. Leading among the denominations were the Baptists, all bodies, with 1,071 organizations; the Roman Catholics, 959; the Congregationalists, 301; the Jewish congregations, 179; the Lutherans, all bodies, 317; the Methodists, all bodies, 2,563; the Presbyterians, all bodies, 903; the Protestant Episcopals, 735; the Reformed, 323; and the Universalists, 168.

In 1896, and for many years previous, New York stood first among the states in the strength and organization of its National Guard. Reports made in 1896 showed the actually organized force to consist of 730 commissioned officers, 12,159 infantry, 134 cavalry and 416 artillery. Additional troops of cavalry were formed in Brooklyn and Buffalo during the year. There was also a battalion of naval militia, numbering 344 officers and men, and 2 separate divisions of an aggregate strength of 100. The military force of the state is divided into four brigades, which include, in addition to the forces mentioned, signal and hospital corps. The state appropriations, including a permanent one for ordinary expenses of $400,000, average close to half a million dollars annually. The Federal appropriation varies with the needs of the guard, amounting in 1894 to $31,000, and having reached $50,000.

At the time of the taking of the Federal census of 1850 there were but 1,361 miles of railway in the state of New York. In 1860 there were 2,682 miles; in 1870, 3,928 miles; in 1880, 5,991 miles; in 1890, 7,745 miles. Later reports have not been regularly made, but the mileage in 1900 was not far from 8,230. The time from 1890 to 1895 was not favorable for railway-construction, the greatest amount in any year being 99 miles of main line in the fiscal period ending June 30, 1894. The total number of passengers carried on the steam roads in 1900 was 73,846,114, and on the street surface and elevated roads, 1,986,138,207. In 1900, 671 persons were killed, and 1,374 injured by the steam roads; while the accidents on the street and elevated railways aggregated 152 killed and 665 injured. The funded debts of the various roads was decreased within the year mentioned by $1,264,021, and the non-funded debt increased $13,941,656. The average percentage of dividends declared during the year was 2.63, as against 2.69 in 1894.

The canals of New York began to receive legislative attention in 1893–94, and in 1895 a proposition was submitted to the voters of the state to issue bonds to the amount of $9,000,000 for the purpose of improving the canals of the state by deepening and in other ways fitting them for greater traffic. This act was approved by a large majority of the voters of the state, and a tax, amounting to $\frac{1.3}{100}$ of a mill on each dollar of valuation of real and personal property in the state, is to be annually imposed for the purpose of meeting the maturity of the bonds and the annual interest thereon. The use of electricity as a motor for boats on the canals will, it is estimated, increase the traffic at least thirty per cent, and with the waterways deepened a revival of shipping interests is expected.

The report of the Commissioner of Insurance for 1900 shows that the total receipts of 182 fire and marine insurance companies for the year were $167,371,063. The assets of N. Y. joint-stock companies doing business in the state were for 1900 $91,851,548; the assets of N. Y. life insurance companies for the same year were $1,042,317,839.

In 1895 there were nearly 600 libraries in New York of 1,000 volumes and over each, containing an aggregate of nearly 4,500,000 bound volumes

* Name changed from Columbia College, 1896.

and 500,000 pamphlets. Of these, about 250 were school libraries, 30 college, 100 public, and the remainder divided among legal, theological, college society, medical, government, state, social, scientific, Y.M.C.A., public institution, garrison, mercantile and miscellaneous. The traveling library system originated in New York in 1893, when the Albany State Library officials resolved to loan boxes of from fifty to one hundred volumes each to such public libraries as needed them, and to communities where no libraries existed. The library remains in one place but six months, and is then returned to headquarters, to be followed, if desired, by another selection, while it is forwarded elsewhere. A small fee is paid by the borrowing library or town, sufficient to cover transportation charges and the wear of the books. Iowa, Michigan and Montana have followed the example set by New York, and the traveling library is now established by law in all of the states named.

The principal cities and towns of New York, with their populations according to the Federal census of 1890, and a Federal census taken in 1900, are given in the following table:

Cities.	1890.	1900.
New York	1,515,301	3,437,202
Brooklyn	806,343	1,166,582
Buffalo	255,664	352,287
Rochester	133,896	162,608
Albany	94,923	94,151
Syracuse	88,143	108,374
Troy	60,956	60,651
Utica	44,007	56,383
Binghamton	35,005	39,647
Yonkers	32,033	47,930
Elmira	30,893	35,672
Auburn	25,858	30,345
Newburg	23,087	24,943
Cohoes	22,509	23,910
Poughkeepsie	22,206	24,029
Oswego	21,842	22,199
Kingston	21,261	24,535
Schenectady	19,902	31,682
Amsterdam	17,336	20,929
Jamestown	16,038	22,892
Lockport	16,038	16,581
Rome	14,991	15,343
Watertown	14,725	21,696
Gloversville	13,864	18,349
Middletown	11,997	14,522
Ogdensburg	11,662	12,633
Ithaca	11,079	13,136
Mt. Vernon	10,830	20,346
Niagara Falls		19,457
Lansingburg	10,550	12,595
New Rochelle	9,057	14,720
Saratoga Springs	11,975	12,409

At the close of 1900 there were 200 state banks in New York, which reported, together with four private banks, assets and liabilities of $271,448,300. Items of the liabilities were $11,136,005 undivided profits, $178,331,859 due depositors on demand, and $16,148,856 surplus fund. The number of national banks was about 337, their combined capital nearly $97,336,000, their circulation and reserve $316,827,788, and individual deposits about $924,600,000. There were, also, about 59 loan and trust companies, whose capital would average almost $1,000,000 each, and whose deposits would aggregate about $640,000,000.

On Jan. 1, 1899, the newspapers published in New York numbered 2,009, of which 189 were daily, 5 triweekly, 48 semiweekly, 1,141 weekly, 12 fortnightly, 35 semimonthly, 1 every three weeks, 522 monthly, 16 bimonthly, 1 six times a year, 1 five times a year, 37 quarterly, and 1 semiannually. Papers were published in all of the 60 counties, and in 488 of the cities, towns, and villages, of which 63 are county seats.

The following is a list of the governors of New York from 1777, with their respective terms of office:

George Clinton	1777–95	Horatio Seymour	1852–54
John Jay	1795–1801	Myron H. Clark	1854–56
George Clinton	1801–04	John A. King	1856–58
Morgan Lewis	1804–07	Edwin D. Morgan	1858–62
Daniel D. Tompkins	1807–17	Horatio Seymour	1862–64
John Taylor	1817	Reuben E. Fenton	1864–68
De Witt Clinton	1817–22	John T. Hoffman	1868–72
Joseph C. Yates	1822–24	John A. Dix	1872–74
De Witt Clinton	1824–26	Samuel J. Tilden	1874–76
Nathaniel Pitcher	1826–28	Lucius Robinson	1876–79
Martin Van Buren	1828–29	Alonzo B. Cornell	1879–82
Enos T. Throop	1829–32	Grover Cleveland	1882–84
William L. Marcy	1832–38	David B. Hill	1884–91
William H. Seward	1838–42	Roswell P. Flower	1891–94
William C. Bouck	1842–44	Levi P. Morton	1894–97
Silas Wright	1844–46	Frank S. Black	1897–99
John Young	1846–48	Theodore Roosevelt	1899–1901
Hamilton Fish	1848–50	Benjamin B. Odell, Jr.	1901–05
Washington Hunt	1850–52	Frank W. Higgins	1905–

See also New York, Vol. XVII, pp. 462–469.

*NEW YORK CITY.—The early history of the American metropolis, its development and progress, up to the year 1884, may be found in Vol. XVII, pp. 469–479 of this Encyclopædia. The greater city expanding and enlarging every year, spreading and reaching far beyond the confines of Manhattan Island, had in 1905, included a part of Westchester County to the north, Queens County to the east, and all of Kings County and Richmond County to the south. The greater city under the charter of 1902 is divided into five boroughs: Manhattan, consisting of Manhattan Island, Governor's Island, Bedloe's Island, Ellis Island, Blackwell's Island, Randall's Island, Ward's Island, and Oyster Island; Bronx, consisting of all that portion of the city lying north or east of the Harlem River between the Hudson and the East rivers, and Long Island Sound, including City, Traver's, Hart's and Riker's Islands; Brooklyn, consisting of the former city of Brooklyn, and all of Kings County; Queens, including the present county of that name; and Richmond, consisting of Staten Island. The business center of the city proper since 1895 has been gradually moving northward, while since 1884, the shopping, hotel and amusement centers haved changed from 14th street to 23rd street, and thence to 33rd street, to 42nd street and Columbus Circle at the entrance to Central Park. The trend is still further northward, and 125th street, in Harlem, promises eventually to be the great throbbing heart of activity on Manhattan Island.

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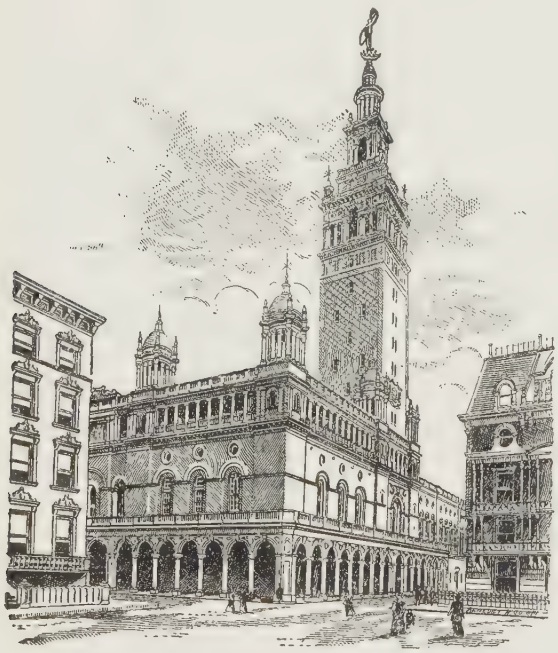
ARCHITECTURE. — In the latter-day construction of buildings in New York, architecture becomes a matter of style rather than of beauty. The sky-line changes each year owing to the ever increasing number of "sky-scrapers" which in late years are reared quickly in most unexpected portions of the city. The styles are various, Greek, Roman, Gothic, Italian, Tudor, Renaissance and modern French. Office buildings of astonishing height predominate. Among the more prominent of these are the Park Row Building, 385 feet in height; Pulitzer Building, containing the offices of the New York *World;* the New York Life Insurance Building; Bowling Green Building; American Surety Building; American Tract Society; Broad Exchange Building; St. Paul Building; Manhattan Life Building; Commercial Cable Building; Empire Building; Standard Oil Building, and Washington Insurance Company, all over 250 feet in height. The Fuller, or "Flat-Iron" Building at 23rd street, Fifth avenue and Broadway, towers skyward 286 feet. The new *Times* building, at 42nd street, and Broadway, is 25 stories above the curb and is 358 feet high. The Produce Exchange Building, near Bowling Green, covers an area of 300 by 150 feet. The cornice is 116 feet above the street, and the top of the campanile, or tower, reaches 225 feet. It is built of brick and terra-cotta, in the modern Renaissance style. Madison Square Garden, at Madison avenue and 26th street, is built of buff brick with terra-cotta trimmings, and has an Italian tower rising to a height of three hundred feet, bearing aloft, at the peak of a minaret, a gilded statue of Diana. This building contains an amphitheater of thirty thousand square feet, available for fairs, conventions, and exhibitions. There is also a theater, concert-hall and roof-garden. The amphitheater will seat 15,000 people. The New York hotels in number, size and magnificence rival those of any city in Europe. The Waldorf-Astoria, Fifth avenue, 33rd and 34th street, is the largest and best equipped hotel in the world. It is constructed of red brick with terra-cotta trimmings. The Hotel Astor, Knickerbocker and St. Regis are recent additions to the list of leading hotels, which include the better known Astor House, Fifth avenue, Hoffman House, Majestic, Netherland, Park Avenue, Plaza, St. Denis, Savoy, Vendome, and Murray Hill. The St. George and Marguerite, in Brooklyn, are also of attractive architecture, as is Hotel Castleton on Staten Island. Gothic architecture in New York is best represented by the Roman Catholic Cathedral in Fifth avenue. See also PUBLIC BUILDINGS; MONUMENTS.



MADISON SQUARE GARDEN BUILDING, NEW YORK.

PARKS AND DRIVEWAYS. — The public parks are managed by a board of three commissioners appointed by the mayor. In addition to the two largest parks, Central Park, Manhattan, and Prospect Park, Brooklyn, there are 51 parks in Manhattan, 17 in the Bronx, 38 in Brooklyn, and 5 in Queens, the total acreage being 6,982. The new Bronx Park, is in the central northern section of the Bronx borough. The northwestern section of 250 acres has been assigned to the Botanical Society, whose gardens are free to the public. The southeastern section of the park comprising 261 acres, is in charge of the Zoölogical Society, and its buildings are free to the public except on Mondays and Thursdays. Riverside Park and Riverside Drive are on the upper west side along the banks of the Hudson River. Van Cortlandt Park, adjoining the Yonkers boundary, contains 1,069 acres. Pelham Bay Park, in the eastern corner of the Westchester annexed district, fronts upon Long Isand Sound and and contains an area of 1,700 acres. Plans are making for parkways connecting Van Cortlandt Park with Bronx Park, Bronx Park with Pelham Bay Park, and Crotona Park with Bronx Park. In Brooklyn there are the Ocean Parkway, running from the southern end of Prospect Park to Coney Island; Eastern Parkway, from the northern end eastward 2½ miles, with an extension 2½ miles farther; Fort Hamilton avenue, from the southeastern side to Fort Hamilton, about four miles; Bay Parkway, branching off from Ocean Parkway and running to Bensonhurst; 75th street; and Bay Ridge Shore Drive. The Speedway, a public road for fast driving, 100 feet wide, extends for a distance of two miles along the foot of the bluff on the west bank of the Harlem River.

MONUMENTS. — There are sixty monuments and statues, allegorical and personal, to be found in the public parks and squares of New York city. Among those erected since 1884 is the white marble statue of Columbus in Central Park, unveiled in 1892. It consists of a lofty column surmounted by a colossal figure of Columbus. Allegorical figures are at the pedestal and base of the column. The colossal effigy of Liberty Enlightening the World, on Bedloe's Island (see BARTHOLDI and BEDLOE'S ISLAND, in these Supplements) was dedicated in 1886. Other monuments include a bronze bust of Beethoven, Central Park, (1884); equestrian statue of Simon Bolivar, Central Park; bronze statue of Roscoe Conkling, at Madison Square (1893); the letter-carriers' commemorative statue, in bronze of S. S. Cox, in Astor Place; a

statue of William E. Dodge, a New York philanthropist and merchant, at 36th street and Broadway (1885); Garibaldi, in Washington Square (1888); two statues of Horace Greeley; a bronze of Nathan Hale, the Revolutionary martyr-spy, in City Hall Park (1893); an equestrian statue of General Winfield S. Hancock, near the northern end of Central Park; a bronze of Dr. James Marion Sims, in Bryant Park; one of Thorwaldsen in Central Park, and one of John Ericsson, commemorating, on a panel, the fight of the *Monitor* and *Merrimac*, at the Battery (1893). The Grant Tomb, on Riverside Park, overlooking the Hudson River, was brought to completion in 1896. The main structure is square, with a projecting Greek porch, intended to supply a background for equestrian statues of Grant and his generals. It is surmounted by a circular tower, of which one member is a Greek arcade. Among other public works of art is the Washington Arch at the

WASHINGTON ARCH, NEW YORK.

north entrance to Washington Square. It is of pure white marble, in the Roman triumphant style, and consists of a single arch, with pedestals at the base for the reception of statuary. The arch, above its piers, which are plain, is highly enriched with emblematic and decorative carving in relief. In the Bronx, at Mott avenue and 161st street, a fountain commemorative of the German poet, Heine, was erected in 1899. In Brooklyn a bronze equestrian statue of General Grant was erected in 1896 in Bedford avenue. There were also erected in Brooklyn, a bronze statue of Major-General G. K. Warren in Prospect Park (1896); a bust of Mozart in Prospect Park (1897); and a Maryland Soldiers' Monumental shaft in Prospect Park (1895).

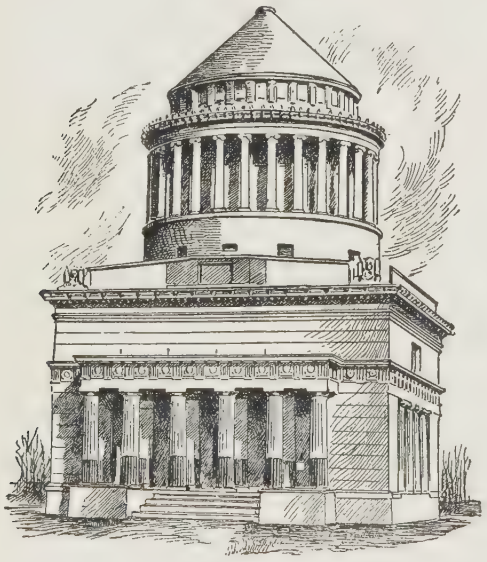
CEMETERIES.— In 1904 there were 44 cemeteries in and about the city, including Calvary, Cypress Hills, Greenwood, Kensico, Evergreen, Lutheran, Maple Grove, Marble, Mount Hope, Mount Olivet, Rockland, Rosedale, Trinity, Union, Washington and Woodlawn. The borough of Queens contains more cemeteries than any other section. The number of interments in that borough is 2,500,000, of which 2,000,000 are in the town of Newtown, which has a cemetery area of 1,800 acres. The largest average burial per acre has been reached by Calvary Cemetery — 600,000 in 214 acres, or an average of 2,800 burials to the acre. A crematory was established at Fresh Pond, on Long Island, in 1885. The building is in the style of a Grecian temple. To January 1, 1905, over 2,400 bodies had been incinerated here.

NEW PUBLIC BUILDINGS.— Within the past two decades few public buildings have been erected in New York. In 1903 the New York Stock Exchange building was opened at the head of Broad street, near Wall. The new Customs House, under course of construction in 1905, at the foot of Broadway on the original site of Fort Amsterdam, is to cost $10,000,000. The Tombs Prison, being rebuilt in 1905, and the Hall of Records, nearing completion at Chambers and Center streets, are notable among new municipal buildings. A new Post-Office building is in contemplation, the site to be in the vicinity of 42nd street.

BRIDGES.— The new Williamsburg Bridge over the East River, opened in 1904, gave to the metropolis a structure greater and more imposing than the famous Brooklyn Bridge. (See NEW YORK, Vol. XVII, pp. 477, 478.) The tower foundations of the bridge in Manhattan are at the foot of Delancey Slip, and in Brooklyn at a point between South Fifth and South Sixth streets. The bridge ends at Clinton street in Manhattan, and at Havemeyer street in Brooklyn. The dimensions of the bridge are as follows: — Main span, 1,600 feet; entire bridge, between terminals, 7,275 feet; width of bridge, 118 feet; minimum height of bridge above mean high water, 135 feet; height of center of cables at top of towers above mean high water, 332 feet, 8½ inches; width of carriage ways, each, 20 feet; width of two foot walks, each, 10½ feet; width of two bicycle paths, each, 7 feet; width of four trolley car tracks, center to center, 9¾ feet; width of two elevated railroad tracks, center to center, 11 feet; New York side — north caisson, 55 feet below low water mark; south caisson, 66 feet. Brooklyn side — north caisson, 107.5 feet below low water mark; south caisson, 91.9 feet. The tower foundations are 23 feet above high water mark, and the towers that are placed on top of them are made of steel. The estimated cost is about $11,000,000, exclusive of real estate. Two other bridges over the East River are under construction: The Manhattan Bridge, on which the work of construction of tower foundation in Brooklyn commenced August 29, 1901; title to land vested in the city, September 14, 1901. Plans for the new Blackwell's Island Bridge were approved by the War Department February 23, 1901. Ordinance providing for the issue of stock to the extent of $550,000, signed by the mayor, May 21, 1901; title to land vested in the city, December 22, 1901. Work of constructing the piers commenced July 19, 1901. The date set for its completion being

in 1908. A new bridge over the Harlem River, completed in 1895, at a cost of about $2,000,000, leads from Eighth avenue to Central avenue. It is 66½ feet wide, is the largest drawbridge in the country, and the bridge proper has a length of 1,920 feet. On the south side it is connected with Washington Heights at One Hundred and Fifty-fifth street, by a viaduct built of iron and steel, with asphalt sidewalks and road ways. (See also TRANSPORTATION.)

DEFENCES.—Since 1884 the Federal government has expended millions of dollars in constructing military defences for New York harbor, including the improvement and enlargement of old fortifications and the construction of new works. The fortifications surrounding the city are those protecting the eastern approaches by way of the Sound, and those protecting the southern approaches, by way of Sandy Hook. Those of the first division are Fort Schuyler, on Throgg's Neck, fifteen miles from the City Hall, and opposite to it, Fort Totten, on Willet's Point. Five miles east of Fort Schuyler is Fort Slocum. The forts



GENERAL GRANT'S TOMB.

of the second division are Fort Hamilton, on Long Island, and at the Narrows, and opposite to it, Forts Wadsworth, Tompkins, and Newton, on Staten Island. At Sandy Hook are the Government Proving Grounds and a series of detached works or heavy batteries known as Fort Hancock. Opposite, on Plumb Island, and just east of Coney Island, a new work is now being erected. Two hundred yards from shore, opposite Fort Hamilton, is Fort Lafayette, used as a powder storehouse by the navy. Governor's Island, opposite the Battery Park in New York, is the headquarters of the Department of the East and saluting station of the harbor.

GREATER NEW YORK.—Under a state commission appointed in 1890, by the legislature, a project was brought forward to consolidate Brooklyn and adjoining districts with New York city under one municipal government, known as Greater New York. In 1894, a bill was passed defining the limits of the proposed consolidation, and submitting the unification to the popular vote of the districts involved. Under this act, Greater New York embraced an area of 327 square miles. The consolidation was approved by a small majority of the people, when submitted to them, but their action was not confirmed until 1896 when the legislature gave effect to the popular will, and directed a commission to draw up a charter for the common government. The charter was revised by the legislature in 1901, was signed by Governor Odell and became a law on January 1, 1902.

GOVERNMENT.—Under the charter of 1902 the executive power is vested in the mayor, elected for two years; a comptroller, elected for two years; and a board of aldermen, consisting of 73 members, elected for two years; and a president elected at large for the same term. For local administration, the city is divided into five boroughs, Manhattan, Brooklyn, Bronx, Queens and Richmond. The president of each borough is elected for two years. The mayor appoints the heads of departments and commissioners, except those over which the presidents of the boroughs have jurisdiction, and except also the comptroller or head of the department of finance who is elected by popular vote. He can, with few exceptions, remove any official appointed by him, and can himself be removed by the governor after a hearing upon charges. The mayor has the power of veto over all ordinances and resolutions of the Board of Aldermen, but an ordinance or resolution can be passed over his veto by a vote of two-thirds of the members of that body. The president of each borough presides over each local board in his borough, with the right to vote on and of veto over its actions, and is an ex-officio member of the board of estimate and apportionment. He is also a member of the Board of Aldermen and has the same right to vote as any member elected to that body.

CIVIL SERVICE.—Under the laws of 1899 there is a Municipal Civil Service Commission. The rules apply to all positions in the service of the city of New York except officers elected by the people, all legislative officers and employees, heads of any department, or superintendents, principals, or teachers in a public school, academy or college. This requires "examinations, wherever practicable, to ascertain the fitness of applicants for appointment to the civil service of the city." The law requires that these examinations shall be competitive.

FINANCES.—The income of New York city for 1904, excluding bonds, was $111,608,194. The interest on bonds for 1904 was $15,188,951. The assessed valuation of property within the city for 1903 was $3,857,047,718, five-sixths of it being real estate. The net bonded debt of the city is $437,796,661. The city tax rate is 1.41 per cent. The city owns property valued at $354,000,000. The annual income from taxation is estimated and apportioned by a Board of Estimation and Apportionment, which also allows for municipal improvements and the expenses of municipal government. The budget for 1905 to pay the charges and expenses of Greater New York amounted to $110,525,259.

Courts and Police.—The courts of New York in 1905 included the Supreme Court (5 judges); the Special Sessions (6 judges); eight Magistrate's Courts (14 magistrates); a Juvenile Court (1 judge); City Court (7 judges); Surrogate's Court (2 judges); the Court of Arbitration, and various state and United States Courts. The Police Department is in charge of a Police Commissioner, four deputy commissioners, a chief inspector, and 16 deputy inspectors. There were 8,352 policemen employed in 1904. The appropriation for the maintenance of the police department in 1904 was $12,030,500. There are 36 police stations in Manhattan Borough. A body of harbor police patrol the rivers in rowboats, with headquarters on the police steamer, *Patrol*. In summer a steamboat squad is detailed to accompany all pleasure-boats plying to suburban and seaside resorts. In 1904

COLUMBUS MONUMENT, NEW YORK.

a mounted squad was established to control and regulate street traffic. A bicycle squad patrols Fifth avenue and the leading driveways. The prisons within the city limits are designed only for those prisoners awaiting trial. These include the Tombs, Ludlow street jail and the various police court prisons. On Blackwell's Island in the East River, are the Penitentiary, Almshouse, Workhouse and numerous city asylums and hospitals.

Charities.—In New York there are 28 hospitals, refuges and asylums receiving municipal aid and 89 hospitals and dispensaries supported by endowment and voluntary contributions. The leading charitable institution is the Charity Organization Society, which is supported by voluntary contributions and legacies. The Children's Aid Society has provided 75,000 boys and girls with homes and places of employment, and in its industrial schools given aid and instruction to over 115,000 children. Two other well-known organizations are the New York Foundling Hospital, controlled by the Sisters of Charity and the Society for the Prevention of Cruelty to Children. Other institutions are the Catholic Protectory, the House of Refuge, the Grace Institute, endowed by William R. Grace in 1897, the Legal Aid Society, the Prison Association, the Provident Loan Society; the Baron de Hirsch Fund for the benefit of Hebrew emigrants; various Church and College Settlement Houses and the Sailors' Snug Harbor, on Staten Island. There is a City Department of Charity managed by a commissioner appointed by the mayor. The yearly appropriation for this department averages $2,000,000.

Fire Department.—The amount appropriated for fire protection in New York in 1904 was $5,968,300. There were 3,753 firemen employed during the same year. The department is controlled by a commissioner appointed by the mayor. In 1904 the apparatus consisted of three fireboats, 158 steam fire-engines, 6 water towers, 45 hook and ladder trucks, and 685 horses. During the year there were 5,839 fires, with a total estimated loss of $4,510,982, on which the insurance was $164,506,440.

Building Department.—There is a Bureau of Buildings in each of the New York boroughs, in charge of a superintendent. No building can be erected unless the plans are approved by this Bureau. There is also a Tenement House Department, in charge of a commissioner. The Department is divided into the New Building Bureau, the Inspection Bureau and the Bureau of Records. The New Building Bureau examines plans for light and ventilation of tenement houses; the Inspection Bureau inspects completed tenement houses, and the Bureau of Records keeps a record of all tenement houses in the city. The estimated cost of the new buildings in New York for 1904 was $96,000,000, and the cost of alterations, $11,500,000.

Public Works.—The streets and avenues of New York are in charge of a commissioner appointed by the mayor. The appropriation made in 1904 for cleaning the streets was $6,437,020, and for maintaining and repairing highways, $2,375,454. The streets of New York in 1904 had a total length of 2,534½ miles, of which 1,765 miles were paved. The total length of the city's sewers is 1,557 miles. The annual cost of removing the garbage and ashes is $2,511,780. The street-cleaning department expended $750,000 during 1904 removing snow and ice from the streets during the winter months. The streets are lighted by 46,835 gas lamps and 16,316 electric lights. There are 26,853 fire hydrants in Manhattan and the Bronx. The city owns its own water works, including 2,000 miles of mains, which cost $122,590,000. The water supply is in charge of a commission consisting of the mayor, comptroller and four special commissioners. A second conduit of the Croton system was completed in 1890 at a cost of $25,000,000. The present work of the commission is concerned with the extension of the

storage system. Titicus dam, near Purdy's Station, in the northeast of Westchester County, was completed at a cost of nearly $1,000,000, and 4,000,000,000 gallons of water were stored in the adjacent reservoir. The Cornell dams, with a storage capacity of 30,000,000,000 gallons, were finished at a cost of $4,150,000, and the Croton dam, completed in 1904, will have a storage capacity of 32,000,000,000 gallons, making a total capacity for New York of nearly 70,000,000,000 gallons. The Jerome Park reservoir, begun in 1895, is estimated to require twelve years for its completion. It will cost $5,473,060 and its capacity will be 1,500,000,000. The daily consumption of water in the city in 1904 was 463,103,000 gallons.

Docks.—The Department of Docks and Ferries is conducted by a commissioner appointed by the mayor. There were 61 piers on the East River front and 72 on the North River in 1904. In the same year there were 4 new piers constructed and over 500 feet of bulkhead.

Excise.—The Excise Department was formerly under the control of three commissioners, but in 1896 the passage of the Raines Law put an end to the old system of licenses, and transferred the control of the liquor traffic to the state. (See Liquor Laws, in these Supplements.)

Education.—The city in 1904 had 502 free school buildings with 16,569 teachers; the educational system being maintained at a cost of $21,431,379. The school system is under the control of 21 commissioners, appointed by the mayor, and there are subordinate district boards in charge of local interests. The Normal School at 69th street and Park avenue, and the College of the City of New York at 138th street and Amsterdam avenue, are the highest schools of the public system. The schools were attended by 535,000 pupils in 1904. The new schools established by the University of New York in late years include the Graduate School (1886); the University Law; the School of Pedagogy (1890); the New York-American Veterinary College (1899) and the School of Commerce, Accounts and Finance (1900). Among the new buildings of the University is the Library building, the open colonnade of which is known as the Hall of Fame. The arrangement of the library is on the plan of semi-circular rooms, of which there are eighteen. In 1904 there were 67,364 volumes in the library. The students in 1904 numbered 2,177, the professors 93, and lecturers and instructors 95. Other educational institutions in New York are: the College of St. Francis Xavier, Columbia University, Manhattan College, St. John's College, Teachers' College, Brooklyn Polytechnic Institute, Adelphi College, St. Francis College, St. John's College in Brooklyn, Packer Collegiate Institute, and Barnard College. The medical schools are the College of Physicians and Surgeons of Columbia University, Bellevue Hospital Medical College, New York University Medical School, Cornell University Medical School, and the Post-Graduate Medical School. There are also the New York Dental College, New York College of Pharmacy, American Veterinary College, and the New York College of Veterinary Surgeons. The art schools include the Art Students' League, the Academy of Design, and the art schools of the Metropolitan Museum of Art, Cooper Union, and Gotham Art Institute. The principal schools of music are, the National Conservatory of Music, New York College of Music, the Grand Conservatory of Music, and the Metropolitan College of Music.

Libraries.—The New York Public Library was established in 1895 by the consolidation of the Astor and Lenox libraries and the Tilden Trust. The Tilden Trust was created in 1884 by the will of Samuel J. Tilden, and at the end of a legal contest, became possessed of $1,000,000. The consolidated library has an invested endowment of $4,500,000, contains 750,000 bound volumes and 220,000 pamphlets. The new Public Library building now under construction at 42nd street and Fifth avenue, will be completed in 1907 and will cost $2,800,000. The Carnegie Library endowment of 1901, provides for 50 branch library buildings which will cost over $3,000,000. Throughout the city there are many institutional, private and special libraries, that of Columbia University including 350,000 volumes; the library of the New York Historical Society, 100,000 volumes; the Society Library, 100,000 volumes; the Mercantile Library, 233,000 volumes; the City Hall Library, 20,000 volumes; the Museum of Natural History Library, 75,000 volumes; New York Law Library, 55,000 volumes, and the New York Academy of Medicine Library, 80,000 volumes.

Churches and Religion.—Exclusive of Brooklyn, there were 687 churches and chapels in New York on January 1, 1905. These include 151 Roman Catholic, 138 Protestant Episcopal, 86 Presbyterian, 103 Methodist Episcopal, 69 Baptist, 52 Reformed, 68 Lutheran, 18 Congregational, 7 Christian Science, 4 Disciples of Christ, 2 Friends, 7 Moravian, 4 Unitarian, 3 Universalist, 2 Evangelical, and 43 miscellaneous churches and chapels, and 110 Jewish synagogues. The new Cathedral of St. John the Divine, at 110th street and Morningside avenue, when completed will be one of the finest buildings in the United States. Plans for the cathedral were completed in 1892, the corner stone was laid on December 27, 1892. The external length of the structure will be 520 feet. The width across the front will be 192 feet; the width across the transepts, 296 feet; the height of the central spire will be 445 feet, from the floor of the cathedral. The width of the front towers will be 57 feet, while their height will be 240 feet. The width of the four flanking towers will be each 43 feet, and their height will be 160 feet. The exterior diameter of the central tower will be 116 feet. The nave will be 180 feet long. The chancel vaults will be 115 feet high. In Brooklyn there are over 550 churches of all denominations, and in Greater New York there is a total of over 1,300 churches. The total value of church property in the city is estimated at $185,026,000. Of this amount Manhattan church property is valued at $95,076,000.

Newspapers and Periodicals.—In 1905 there were regularly published in New York city over 600 periodicals, of which 38 were daily newspapers, 224 weekly periodicals and 275 monthly magazines. One-third of all the cloth bound, and two-thirds of all the

paper bound books published in the United States bear a New York imprint.

CLUBS.—In 1905 there were 74 well-known clubs in the metropolis, 49 of them occupying specially built club-houses. Some of the more recent organizations include the Aldine (1895); American Yacht (1883); Army and Navy (1889); Automobile (1899); Barnard (1894); City (1892); Engineers (1888); Grolier (1884); Jockey (1894); Lawyers (1887); Masonic (1894); Players (1888); Strollers (1886); Transportation (1895); Underwriters (1898), and the Wool Club (1894). (See also NEW YORK, Vol. XVII, p. 473.)

PLACES OF AMUSEMENT.—New York in 1905 had 47 theaters and 6 music halls of the first class. It is the greatest theatrical center in the world, and 150,000 people attend the theater nightly. The largest theaters in Manhattan are the Academy of Music, American, Grand Opera House, New Star, New York, Metropolitan Opera House, Proctor's, the West End, and the Windsor. The New York Hippodrome at 6th avenue and 43rd street has an auditorium seating 5,200 persons. The public museums include the Metropolitan Museum of Art in Central Park; the Museum of Natural History at 8th avenue and 77th street; the Aquarium, in Battery Park; the Zoölogical Garden in Central and Bronx Parks, and the Botanical Garden in Bronx Park.

COMMERCE.—New York is the leading seaport of the world. The total import trade is over $600,000,000 a year, or 55 per cent. of the imports of the United States. The total export trade is $560,000,000, or three-fifths of the exports from all the ports of the United States. There are owned in New York 4,000 vessels with a total tonnage of 1,247,828. Over 150 steamship and steamboat lines run from New York to other ports. The total tonnage of the over-sea vessels entering and leaving the port of New York in 1904 was 17,308,058. There are numerous exchanges in the city, the largest being the Produce Exchange. It has a limited membership of 3,000. Other exchanges are the Stock Exchange, Maritime Exchange, Consolidated, Cotton, Metal and Mercantile Exchanges. The New York Chamber of Commerce has a membership of about 800.

BANKS AND BANKING.—In New York in 1904 there were 422 banks of discount (53 national), 59 savings banks, 49 trust companies and 133 building and loan associations. The total stock of the 37 national and 17 state banks which are members of the Clearing House Association is $109,822,700, and their undivided profits $129,257,100—a total of $239,079,800 capital invested in these 54 institutions. The trust companies in 1904 owned $193,044,837 of stocks and bonds; the state banks in 1904 owned $9,720,400, and the national banks (exclusive of bonds held to secure circulation and United States deposits) owned in 1904, $106,412,100, a total of more than $300,000,000 in securities owned by the banks and trust companies of the city. The New York Clearing House transactions for the year ending September 30, 1904, were as follows: Exchanges, $59,672,796,804.41; balances, $3,105,858,575.60; total transactions, $62,778,655,380.01. The average daily transactions: Exchanges, $195,648,514.11; balances, $10,183,142.87; total, $205,831,656.98. Total transactions since organization of the Clearing House (51 years): Exchanges, $1,565,668,321,737.75; balances, $74,684,703,792.63; total, $1,640,353,025,530.38. The average daily receipts of the 53 national banks in New York are $130,976,963; the percentage of cheques received being 92.36. The largest New York Savings bank is the Bowery Savings Bank, which in 1904 had upward of 135,000 accounts open with a total amount deposited of $75,696,854. There are 36 fire and marine and 5 life insurance companies in the city. The securities listed at the New York Stock Exchange in 1904, aggregated $13,550,000,000 in value, divided as follows: railroad stocks, $4,500,000,000; miscellaneous stocks, $3,500,000,000; railroad bonds, $5,000,000,000; miscellaneous bonds, $500,000,000.

MANUFACTURES.—It was estimated in 1904 that there were 43,000 manufacturing establishments in New York city, giving employment to 650,000 people. The official government census for 1900 reported 39,776 manufacturing establishments, employing $921,876,081 capital and 510,774 persons; paying $245,021,881 for wages and $709,109,412 for materials; and having a combined output valued at $1,371,358,468. The principal articles manufactured according to value of output were, men's clothing, in factories ($103,220,201); women's clothing, in factories ($102,711,604); sugar and molasses ($88,598,113); newspapers and periodicals ($51,397,304); foundry and machine shop products ($41,089,475); malt liquors ($39,105,837); cigars and cigarettes ($37,998,261); meat, wholesale, excluding packed meat ($34,923,412); bakery products ($32,239,307); men's clothing, custom work ($22,077,030); coffee and spices ($21,346,195); and millinery and lace goods ($20,983,956). These figures were based on New York city before the Greater New York charter of 1902 and to these totals must be added the figures for Brooklyn, Long Island city and the other surrounding towns now included in Greater New York.

TRANSPORTATION.—The city has nearly 100 street railway lines, all but ten of which are equipped with electricity. There are 1,232 miles of track and the construction and equipment represented an outlay of $250,000,000. The elevated railways in Manhattan and the Bronx are united under one management, the Interurban Railway Company, with four lines running north and south. There are five elevated lines in Brooklyn, all under control of the Brooklyn Heights Railroad Company. Ten large railroad lines have terminal facilities on the New Jersey side of the Hudson River, connected by ferry with New York. The New York Central railroad is the only line directly entering the city. In 1903 the Central planned terminal improvements which will cost $25,000,000, while the Pennsylvania railroad has commenced a tunnel under the Hudson and East rivers and the boroughs of Manhattan and Queens, giving a continuous track between the Pennsylvania and Long Island railroads, with a central station in the borough of Manhattan, and a terminal emergence of the tunnel

system at a point near Thompson avenue, Long Island city. The Pennsylvania project will be completed in 1906 and the estimated cost is $50,000,000. There are ferry lines connecting Manhattan with Brooklyn, Jersey City, Weehawken, Staten Island, Hoboken, Long Island City, and other cities. There are steamship lines connecting with over 140 points on the Hudson River, the Atlantic coast and Long Island Sound.

Rapid Transit.—The first subway or underground electric railway in New York was opened on October 27, 1904. The work was commenced in March, 1900, the total cost being $40,000,000. The building of the subway was first planned officially in 1890, but the first commission was not appointed until 1891. The road in January, 1905, was 20 miles in length, with 64 miles of track, 5½ miles of viaduct, 4 miles of tunnel and 11¼ miles of subway proper. The subway was built by the city, but was leased to an operating company for a long term of years. The cost of the road's equipment was $18,000,000. The line in operation in January, 1905, extended from the Battery, northward to 169th street, with a branch line from 103rd street to 145th street. (See also Underground Railroads, in these Supplements.)

Ship Canal.—The Harlem ship canal connecting the Harlem River with the Hudson River, was built under the authority and with the appropriations of Congress, and was opened on June 17, 1895. The canal, which is a mile in length, was several years in construction and cost $2,700,000. It is 400 feet wide and 15 feet deep.

Immigration.—The greater portion of the immigration into the United States passes through the port of New York. In 1904, of 812,870 immigrants, 606,019 landed in the port of New York. Under the old system the State Board of Immigration had charge of the arrivals, and Castle Garden was used for the reception of the immigrants. In 1891, however, the United States assumed control, abandoned Castle Garden, and established a new depot on Ellis Island, just north of the Liberty Statue. Hither all steerage passengers are transferred from the steamers in which they arrive, and here they are detained until examined and recorded. A ferryboat runs between the Battery and the island, and visitors are admitted to the galleries overlooking the rooms in which the immigrants await registration. A commissioner and assistant commissioner of immigration are stationed in New York.

Vital Statistics.—The Board of Health consists of the president of the Board of Police, the health officer of the port and two other commissioners, one of whom must have at least five years' standing as a practicing physician. The death rate for 1904 was 18.15 per 1,000. The Board of Health is also charged with the regulation of food-inspection and offensive trades and employs a special force of sanitary policemen and inspectors. The municipality supports free floating baths on the East and North rivers during the summer months, and there are six interior permanent baths, free to the public.

History.—In 1883 the Brooklyn Bridge was opened to the public with fitting ceremony, and with this event began the latter-day history of the metropolis. (See New York, Vol. XVII, pp. 469-479.) On August 8, 1885, the remains of General U. S. Grant were escorted to the Grant Mausoleum in Riverside Park by an imposing civic, military and naval procession. In 1886 the Bartholdi Statue was unveiled. A three days' celebration of the inauguration of George Washington as first President of the United States occurred April 29 to May 1, 1889. On May 5, 1891, occurred the dedication of Carnegie Hall, founded by Andrew Carnegie. In 1892 occurred the burning of the Metropolitan Opera House. In the same year occurred the ceremonies of laying the corner stone of the Cathedral of St. John the Divine. On April 26, 1893, a grand pageant began in commemoration of the discovery of America by Columbus, the ceremonies continuing for two days. In 1894 occurred the investigation by the Lexow Legislative Committee of the police and other departments, disclosing the corruption of the municipal government. (See Law and Order Societies, in these Supplements.) The exposure led, in the following autumn, to a combination of men of all parties to redeem the city from the malign influence of Tammany Hall. The elections resulted in a sweeping victory for all the men named on the ticket of the reforming Committee of Seventy, of whom William L. Strong was candidate for mayor. On Mayor Strong's accession, the legislature strengthened his hands by conferring large power to remove from office; the police department was reorganized under a new board of commissioners, and the Raines Liquor Law broke the hold of political organizations upon the saloons. In the Presidential elections of 1896 the city of New York failed, for the first time in fifty years, to give a Democratic majority, and McKinley received a plurality of 20,000 as President. In 1897 Robert A. Van Wyck of Tammany Hall was elected the first mayor of Greater New York. In 1902 Seth Low was elected mayor of the city, under a reform ballot, by a combination of the Republican and the Citizens' Union. Three disasters, wherein forty persons were killed and nearly two hundred injured, occurred in 1902 in Park avenue, within two months. On January 8, a Harlem local on the New York Central railroad telescoped the rear car of a New Haven accommodation, which had been stopped in the Park avenue tunnel by a danger signal. Fifteen persons were killed and thirty-six seriously injured. An explosion in the subway at Park avenue and 41st street, on January 27, killed six persons and injured nearly one hundred. The Murray Hill Hotel, the Grand Central Station, the Grand Union Hotel and the Manhattan Eye and Ear Infirmary sustained damage. The Seventy-first Regiment Armory, at Park avenue and 34th street, was burned on February 22. The Park Avenue Hotel, opposite, caught fire, and seventeen were killed, and fifty were burned and injured. On October 24, 1903, an explosion in the subway at 195th street killed ten persons and injured many others. On November 3, 1903, George B. McClellan, Tammany Hall candidate, was elected mayor by 60,000 plurality over Seth Low the Republican Reform candidate. In 1904, on June 15, the

steamer *General Slocum* burned in the East River, and over 1,000 persons, mainly women and children, perished. In August the Williamsburg bridge over the East River was completed and on October 27, 1904, the New York subway was opened to the public. Early in 1905 the engineers of the Department of Bridges made public the declaration that the Brooklyn bridge would have to be rebuilt at a cost of $5,000,000. On February 9, 1905, fifty persons were injured in a collision on the Third Avenue Elevated railroad, and on February 11, occurred the burning of the Casino Theatre. The New York Rapid Transit Commission announced on February 28, plans for more than 100 miles of new subways to cost $125,000,000. On March 7, 1905, a strike of 5,000 employees of the subway and elevated railroads occasioned a temporary closing of both systems for a period of three days. Plans were perfected during March, 1905, for the building of a municipal gas plant to be owned and operated by the city, and a bill was introduced in the state senate providing for a reduction in the price of gas to 70 cents per 1,000 feet. A citizen's committee of nine on Police Reform investigated crime conditions in New York during March, 1905, and early in April recommended a uniformed head or superintendent for the metropolitan police department, and advised the abolition of the existing force of detective sergeants. An epidemic of cerebro-spinal meningitis prevailed in the city during the spring months of 1905, and during three months the health department reported 1,800 cases and 681 deaths.

POPULATION.—In 1905 the estimated population of New York was 4,112,000. In 1904, the estimated population was 3,732,903. At the last official census in 1900 the population was 3,437,202. The following table gives the census for the five boroughs of Greater New York for 1900 and the approximate population for the same areas in 1880 and 1890:

POPULATION OF NEW YORK CITY BY BOROUGHS 1880 TO 1900.	POPULATION.		
	1900.	1890.	1880.
New York City	3,437,202	2,507,414	1,911,698
Manhattan Borough	1,850,093	1,530,124	1,216,653
Bronx Borough	200,507		
Brooklyn Borough	1,166,582	838,547	599,495
Richmond Borough	67,021	51,693	38,991
Queens Borough	152,999	87,050	56,560

The alien population of New York is given by the census of 1900 as follows: Germany, 736,435; Ireland, 725,511; Russia, 245,525; Italy, 218,918; England, 155,180; Austria, 113,237; Poland, 53,469; Hungary, 52,430; Scotland, 48,929; Sweden, 44,798; Bohemia, 28,849; Canada (English), 30,550; Canada (French), 5,305; Norway, 18,087; Switzerland, 15,474; Denmark, 9,369; Wales, 4,370, other countries, 58,080, making a total of 2,643,957. In 1900 there were 60,666 persons of African descent residing in New York. There were 29,000 more females than males in the Greater city, and of the qualified voters 460,445 were native born and 547,225 foreign born. The census also showed that there were 735,621 families housed in 249,991 tenements or dwellings. New York is the largest Irish city in the world, and the third largest German city in the world.

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WILL M. CLEMENS.

NEW YORK UNIVERSITY, an institution for the education of men, chartered in 1831, located in New York city. It has been governed since 1883 by a board of private trustees. Previous to that time five members of the board were elected by the city. The university consists of three departments: The Faculty of Arts and Sciences, which includes the undergraduate and graduate collegiate courses; the Department of Medicine, commonly known as the University Medical College; and the Department of Law. The original building was erected in 1832, on Washington square. A new structure was erected in 1894, in which are placed the School of Law and the graduate and pedagogical departments. The undergraduate work is carried on at Two Hundredth street, where, in 1892, new buildings were erected near the Harlem River. The medical department is situated on Twenty-sixth street, near Bellevue Hospital. There were, in 1904, in all the departments, 2,218 students and 274 instructors. The university possesses a library of 79,250 volumes. From the organization until 1904, there were graduated 18,368. In 1904, the university had productive funds to the amount of $1,040,097, and an income of $360,000.

NEW YORK, UNIVERSITY OF THE STATE OF, a very remarkable institution, and the only body of the kind in the United States. It is the term applied to the governing body which controls all schools of higher education, libraries, and museums in the state of New York. The elementary schools and high schools are under the supervision of the state superintendent of public instruction, whose duties are similar to those of the like officer in all states of the Union. The governing body of the University of the State of New York consists of a board of regents, who are elected by a joint ballot of the legislature. All higher schools, including technical colleges, theological, law, and pedagogical schools, are controlled by this board, and are obliged to secure their charters through it. The power of the board is absolute, and includes in its scope the financial management of the institutions. Regular examinations are held under the authority of the board, and University Extension work is controlled by it. The University of the State of New York is an outgrowth of the opposition of the country districts to the control of the state educational interests by New York city. This opposition was engendered by the feeling of the patriot farmers, that the colleges of the city were under the control of Tory sympathizers.

NEW ZEALAND. (For the general article, see New Zealand, Vol. XVII, pp. 479–84.) The report of 1901 made the area 104,471 square miles.

The North Island is estimated to embrace an area of 44,468 square miles, the Middle Island 58,525, while Stewart's Island has an area of 665 square miles. The total acreage of the colony is 66,861,440, and up to the end of March, 1900, 23,382,972 acres had been alienated from the crown.

The total population, exclusive of aborigines, in 1901, the date of the census returns, was 815,820, an increase since 1858 of 667,245, and an increase during the previous five years of 148,176. In 1896 the population was 743,214, including 39,854 Maoris and 3,711 Chinese

The population of the North Island in 1901 was 390,571; of the Middle Island, 382,148; Stewart, and other islands, 493, exclusive of Maoris and Chinese.

Of the Maoris, 23,100 were males, and 20,001 females. The total number includes, 3,123 half-castes, living as members of Maori tribes, and 196 Maori wives of European husbands.

At the census of 1901 there were five towns with over 10,000 inhabitants in New Zealand; namely, Auckland, 34,213, or with suburbs, 67,226; Wellington (the seat of government), 37,441, or with suburbs, 44,791; Christchurch, 16,964, or with suburbs, 56,330; Dunedin, 24,879, or with suburbs, 52,390; and Lydenham, 11,404. All the towns showed an increase in population between the enumerations of 1891 and 1901.

Government. The system of government remains the same as described in Vol. XVII, p. 483.

The Legislative Council consisted, in 1901, of 45 members, nominated by the crown for seven years. By an act passed in 1887, the number of members to be elected to the House of Representatives was reduced to 74, including four Maoris, elected by the people for three years. The qualifications of electors are as follows: For Europeans of both sexes, 21 years of age and upward, a residence in the colony for one year and in the electoral district for three months immediately preceding registration. The property qualification was abolished in 1896. No person may be registered on more than one electoral roll. Women cannot be members of either branch of the legislature. For Maori representation, every adult Maori resident in any Maori electoral district can vote, provided he (or she) be not registered on any European roll. At the elections in 1896 there were 196,925 men and 142,305 women electors on the rolls for the 70 European members; and 13,008 votes of natives were recorded for the four Maori members.

The general administration rests with a responsible ministry of seven members. The governor, appointed by Great Britain, receives a salary of $25,000. The debt, in 1900, was $240,000,000.

New Zealand, during the last decade of the nineteenth century, became the experimental battle ground for formulating and working out theoretical solutions of social problems. A tendency towards the extension of the functions of the state to settle and prevent strikes and lockouts had been growing for some time previously, but began to take definite shape, in 1890, when the labor element exercised a dominant influence in the legislative election. The movement for the amelioration of labor conditions was not confined to a class, but able and philanthropic minds from all walks of life were enlisted in the cause. Some of the schemes proposed and tried were declared to be failures, but after they had had time to adjust old conditions to the new order of things in the transition period, they were admitted to be decided improvements. Of those in full and successful operation in 1905 were resumption of landed estates by the crown, old age pensions, advances of cheap money to farmers, graduated land and income tax, conciliation and arbitration in industrial affairs, compensation to workmen for accidents; government insurance for life, accident and fire; state coal mines and state railways, telegraphs and telephones.

In the course of progressive legislation by the New Zealanders, the first great step taken, in a purely economic sense, was to relieve the farmers of a defective land tenure and an unjust system of taxation. The few early settlers had in many instances acquired large estates for nominal sums and, as population increased and railroads were built, they became valuable and made the owners anxious to hold them for speculative purposes. In addition to this, a system of taxation existed which was based on actual values, so that the more a man improved his property the more he was taxed. This system bore especially hard upon the small farmer whose buildings and stock constituted the bulk of his possessions, and who was obliged to improve his land up to the highest point of fertility in order to make a living. Every successful effort in improving his holdings increased the burden of his taxes. Reform in this respect was instituted by abolishing the property tax and establishing a land and income tax. Land was taxed minus improvements and with exemption for all below $2,500 in value. Added to this was a graduated tax (rising from one penny in the pound to two pence) and commencing at farms valued at $25,000, such a farm would pay $10 annually for this tax, while an estate worth $1,050,000 or over would pay $8,756. An extra twenty per cent. is charged for land held by absentees from the colony. The annual income of the land tax from 1900 up to 1905 was $1,500,000. The total number of land owners in 1904 was 115,000, but some of their holdings were mere town sections and those who paid the tax numbered 18,500. With the repeal of tax on improvements, industry and enterprise were stimulated, and to aid the struggling small farmer still further the government loaned money to settlers at cost, thus enabling them to pay off mortgages or take up land for use, as the case might be. This assistance caused a new era of prosperity to dawn in the rural dis-

tricts. To prevent the land of the colony from falling into private hands the government became inbued with the idea of gradually leasing its land instead of selling outright, thus preventing its monopolization by the wealthy classes and limiting the lease owner to the area he could profitably use. The effect of the land tax was the government's resumption of some of the large fertile estates. Any landlord king objecting to the government assessor's valuation for taxation purposes is asked to state his own valuation and then the government can take the land at that price with ten per cent. added. It was stated by the secretary of Labor for the Commonwealth of New Zealand, Edward Tregar, in the *Arena* for December, 1904, that "this not only prevents evasion of the land tax and much moral injury to the proprietor through temptation to under-value his own property for such tax purposes, but has enabled the government to break up large estates and divide them among willing hands." As an illustration of its actual workings, he further stated that "on one estate so acquired (the Cheviot estate) the land which a few years ago only supported a dozen shepherds is now covered with homesteads giving occupation and nourishment to about two thousand people."

The legislation having a most salutary effect on the densely settled centers of industry in New Zealand, that known as the "Compulsory Arbitration Act" had a prominent place. Experience has demonstrated the act's feasibility, and while at first many difficulties were encountered from complications arising, the number of disputes calling for adjustment under its provisions decreased in number from year to year, the Arbitration Court in 1903 having only twenty-five cases of that kind to settle. The fact that in about four decisions out of five the awards favored the laborers the cry that the operation of the law would "drive capital out of the country" was a plausible theory, but facts proved that from 1895 to 1904, inclusive, the number of persons employed in manufactures doubled and the value of exports increased in a like ratio. That an award requiring an employer to pay increased wages to his work people might not place such an employer at the mercy of a similar firm in another industrial district, the act empowered the court to extend its award outside one industrial district to another where goods are used in inter-district competition.

A number of smaller acts were passed for the encouragement of industries, the settlement of land and the protection of the working-classes. The provision was made that workers must be paid in cash, not in goods or by a "set off," and that payment of such wages must not be made in any place where intoxicants were sold. A further provision was that wages must be paid within twenty-four hours of demand, and were made first charge on all moneys owing a contractor. The property on which the work is done can be placed under lien until wages are paid, therefore, an owner must see that his contractor liquidates his wage-bill before paying any other expenses. Up to $10 a week, the wages of a worker can not be attached or alienated in advance for debt. A man is not allowed to will away his property, unless his will makes due provision for his wife and family. The railways being public property are run on the principal that any profit accruing above maintenance and the interest on the cost of construction should be distributed generally by reduction of fares and freights. The telegraph and telephone systems are also state property, and financiers cannot manipulate them in the interests of individuals or corporations. "The prosperity of the colony," says Secretary Tregar, "is not to be attributed to the labor-laws, nor to the land-laws, nor to commercial enterprise, but to all three directed in unison for the public good. It is 'the government by the people for the people.'"

Religion. No state aid is given any religion. The principal churches in the colony are Church of England, Presbyterian, Roman Catholic, Methodist, Baptist, and Congregational. In 1896 there were but 3,391 pagans in the colony.

Education. The University of New Zealand is solely an examining body, granting degrees, awarding scholarships, and exercising a general supervision over the colleges of the colony. There are four colleges under its jurisdiction, which had, in 1900, 805 students. In 1900 there were 26 secondary schools, with 195 teachers and 2,665 pupils. The primary schools are in charge of the Education Department. Of these there were, in 1900, 1,674, with 3,856 teachers and 130,724 pupils. School age is from 5 to 15; and between the ages of 7 and 13 education is compulsory in districts in which the compulsory act is enforced. There were 85 native schools, with 3,109 pupils. In addition, there were 304 private schools; also medical, mining, agricultural, engineering, normal, and art schools, a school for deaf mutes, and one for the blind. There were, in 1896, 304 public libraries, with 409,604 volumes. In 1900 there were 54 daily papers, 43 tri-weeklies, 32 semi-weeklies, 66 weeklies, and 26 monthlies.

Judiciary. The administration of justice is in the hands of 5 supreme-court judges, 3 district-court judges, and 29 stipendiary magistrates.

Industries. It is estimated that two-thirds of the surface is suitable for agriculture and grazing. Twenty million acres were, in 1898, under forest. The total acreage under crop in 1900 was 12,474,511 acres (including sown grasses, and 60,792 just broken). There were, in 1896, 83,300 persons engaged in agriculture. The principal crops are wheat, oats and barley. There were, in 1900, 261,834 horses, 1,210,439 cattle, 19,348,506 sheep, 249,027 pigs, and 1,790,070 poultry. There were, in 1895, 2,459 factories, with an estimated capital of $28,980,085, and giving employment to 27,389 persons. These industries include packing establishments, tanneries, mills, saw-mills, and iron-works. Gold, silver, antimony, manganese, and coal are mined, and there are precious deposits of tungsten. In 1900 there was mined $7,198,010 worth of gold, and, in the same year, $194,395 worth of silver.

FINANCE AND COMMERCE. In 1900 the imports amounted to $53,230,000, and the exports to $66,030,000. The total revenue for 1900–01 was $29,530,000, and expenditure $27,400,000. The registered vessels of the colony in 1897 numbered 506. On March 31, 1900, there were 824 miles of government railways in the North Island, and 1,280 in the South Island. The surplus earnings of the railways in the year 1900 were $2,856,000. There are also 167 miles of private railways. The telegraph system is entirely in the hands of the government. The colony had, in 1900, 6,910 miles of line. The telephone is included in the telegraph department.

DEFENSE. The principal ports of the colony are defended by submarine mines, torpedo-boats, and heavy shore batteries. All males from 17 to 55 years of age are liable to serve in the militia. The volunteer force in 1900 had a strength of 9,835, while the available force in 1898 was 118,000.

NEZ PERCÉ INDIANS OR SAHAPTINS. See INDIANS, Vol. XII, pp. 866, 871.

NIAGARA, FORT, a United States military post, in the Department of the East, an inclosed work in Niagara County, western New York, commanding the entrance from Lake Ontario to the Niagara River, about 14 miles below the Falls. It has its own telegraph station, its railroad station at Lewiston, seven miles distant, and post-office at Youngstown. The reservation covers 228½ acres; and had, in 1895, 3 companies of infantry, with accommodations for 4 companies of infantry and 13 officers; has good water-supply from the Niagara River. During the War of 1812 Fort Niagara was a post of great importance, and was the scene of many stirring events. It was, in 1813, surprised and captured and most of its garrison slain.

NIAGARA FALLS, a village of New York, the principal settlement in the neighborhood of the falls, has several flour-mills, and sash and blind factories. The suspension-bridge connects it with the Canadian side, and there is also a bridge to Goat Island. Population 1900, 19,457.

NIAGARA FALLS RESERVATION. For some years prior to 1885, efforts were made by public-spirited persons to have the approaches to Niagara Falls, on the American side, made the property of the state, and free of access to all. Private interests of various kinds stood in the way of this project, and numberless petty extortions were practiced on the public. The legislature of 1884 passed a measure constituting a state commission for the appraisal and condemnation of the structures obstructing the bank of the river, which commission was also empowered to police the reservation when control should be obtained. July 15, 1885, was the day set for the final abolishment of the fee system and of the various hotels and shanties, and on that date the Niagara Falls Reservation, sometimes called the Niagara State Park, measuring 107 acres, at a cost to the state of $1,433,430, passed into the keeping of the representatives of the people forever. A similar reservation, known as the Queen Victoria Niagara Falls Park, on the Canadian side, and embracing about 150 acres, was authorized by the legislature of Ontario, and was opened to the public June 22, 1887.

NIAGARA FORMATION. See *Upper Silurian*, under GEOLOGY, Vol. X, p. 301.

NIAGARA POWER–PLANT. The water-power of Niagara Falls has long claimed the attention of engineers and capitalists. In 1873 a canal was constructed which gave 6,000 horse-power to several mills. The large amount of power going to waste, estimated by some at 7,000,000 horse-power, caused a number of residents of cities near the Falls to organize the Niagara Falls Power Company, chartered in 1886 by the legislature of New York. The first problem to be solved was the proper construction of the turbines and dynamos, as it was proposed to furnish electrical power. A commission was sent to Europe to study power-utilization. A conference of noted civil and mechanical engineers was held in London to discuss the problem. This conference was called the International Niagara Commission, and its method of procedure was to call for plans and ideas from any engineer. The best of these were adopted, and in 1890 the work was begun by the Cataract Construction Company. A tunnel 7,000 feet long, 21 feet high and 19 feet wide was dug, its construction occupying three years. At the same time a canal was constructed, 1,400 feet long, 110 feet wide at the upper end and 180 feet at the mouth. The water is carried from the river to the power-house by means of the canal, and carried away, after passing over the turbines, through the tunnel. There are 14 turbine-wheels, each supplied by a mill-race, and each capable of developing 5,000 horse-power. These turbines are located in a pit 178 feet deep, 140 feet long and 18 feet wide. In connection with each wheel is a dynamo of 5,000 horse-power. The power company obtained possession of two and one half square miles of land, on which have been erected various factories operated by the water-power. The electric current is carried to Buffalo, 18 miles distant, for supplying light to the city and running the machinery of the water-works system. Many private establishments in that city are also furnished with power. It is purposed to supply all adjoining manufacturing centers.

NIAGARA UNIVERSITY, a Roman Catholic institution for the education of men, located in Niagara County, New York, two miles N. of Niagara Falls. This institution was founded in 1856 as a seminary for the training of priests. It was changed to a general educational institution and received its charter from the state of New York in 1883. It includes, in its courses, full preparatory work, theological and general collegiate instruction and a course in medicine. In 1901 there were 200 students in attendance and 20 instructors. The library, in 1901, consisted of 12,000 volumes; and the total income was $60,000.

NIAS ISLAND. See SUMATRA, Vol. XXII, pp. 671–674.

NICARAGUA, Republic of. (For geography, history and general description, see Nicaragua, Vol. XVII, pp. 490–493.) The area, according to the reports of 1900, is about 49,200 square miles, with a population of about 480,000, the great mass of which consists of aboriginal Indians, mulattoes, negroes and mixed races, and a number of Europeans, who are on the increase, numbering, in 1900, about 1,200. There are 28 towns, with from 2,000 to 30,000 inhabitants. The seat of government is the town of Managua, situated on the southern border of the lake of the same name, with about 30,000 inhabitants.

A new constitution was proclaimed July 4, 1894.[1] It vests the legislative power in a congress of one House, the members being elected for a term of two years by universal suffrage, and numbering 40. The executive power resides in a president, whose term of office is four years. He is assisted by a council of four responsible ministers, who have charge of the departments of Finance, Foreign Affairs and Public Instruction, Public Works, and Interior, Justice, War and Marine. June 20, 1895, a treaty was signed by the ministers of Nicaragua, Honduras and Salvador, providing for a union of the three republics under the name "Greater Republic of Central America." This treaty went into effect when it was ratified by all the legislatures, the last to do so being Salvador, May 6, 1896. This federation was intended as a step toward the reorganization of Central American states, and the confederation to be known as the "Republic of Central America." Each government is represented in a Diet, a body composed of two representatives from each republic. This Diet, besides having other functions, is empowered to settle all questions which may arise, touching the interests of the three nations.

The chief occupations of the inhabitants are cattle-raising and coffee-culture. There were about 400,000 head of cattle, and 98,000 acres were devoted to coffee culture, in 1899. Gold, silver and copper are mined. The chief export is coffee. The total imports in 1900 were $3,517,450, and the exports $3,961,015. Trade is increasing, and, with the deepening of the principal harbors and the construction of railways, it is expected that the volume of trade will be doubled. The Nicaragua canal (q. v., in these Supplements) will, when finished, make Nicaragua the great highway between the Atlantic and Pacific oceans. There were, in 1900, 1,245 miles of telegraph lines and 140 miles of railway. The railways are the property of the government. In 1901 the total revenue of the republic was $2,400,375, and the expenditure $2,399,050. The public debt amounted in 1901 to $4,730,000. There were, in 1900, 323 elementary schools, with 17,000 pupils. The active army consists of 2,000 men, the militia of 5,000.

After the interference of Great Britain with the native government of the Mosquito Reserve, and the consequent objection of Nicaragua, the Mosquito Indians, by voluntary action, were incorporated as the thirteenth province of Nicaragua, Nov. 20, 1894. In these troubles the Nicaraguan forces had expelled from the Mosquito territory the British pro-consul. For this act Great Britain presented, Feb. 26, 1895, a formal demand for an indemnity payment of $375,000. Other demands were made for private redress, in favor of British subjects expelled and British vessels seized. Nicaragua demanded arbitration, but Great Britain presented an ultimatum demanding immediate settlement, with a threat of the seizure of the Pacific port of Corinto, in case of non-compliance. Nicaragua expected United States interference, but that was refused, on the ground that in the expulsion of its pro-consul Great Britain had just cause for complaint. April 22d a British fleet entered Corinto harbor, and April 27th the British took possession of the port. May 4th the troops were withdrawn, Nicaragua, persuaded by the United States and Salvador, agreeing to pay the indemnity.

NICARAGUA CANAL. Early in the present century the possibilities of a canal from the Pacific Ocean to the Atlantic side of Central America, through the state of Nicaragua, were realized. The first charter granted to a company formed to construct such a canal was in 1849, and is known as the "Vanderbilt concession." This company failed to carry out its plan, and the project, with intermittent agitation, was not revived until April, 1887, when the government of Nicaragua granted a charter to the New York Nicaragua Canal Association, and on Feb. 20, 1889, the United States Congress chartered the Maritime Canal Company. A Nicaragua Canal Construction Company undertook to do the actual labor of the undertaking. From Oct. 8, 1890, until September, 1891, $2,000,000 were expended, and during the next year $2,000,000 more. The company, in 1891, realizing the great burden of the undertaking, caused a bill to be introduced in Congress providing for government supervision and the appropriation of $100,000,000. This bill failed to pass. In 1892 the Senate passed a bill with almost the same provisions, but the House of Representatives refused to act. In the mean time various private companies, both American and foreign, were organized, but no further expenditures were made. Congressional legislation being again agitated, in 1895 the President appointed a commission of three engineers to examine the work already done and to report upon the feasibility of the undertaking. This commission reported in November, 1895, and gave as the result of its investigations, that a final judgment could not be given without a complete survey of the district being made; that the Nicaragua route is the best for an interoceanic canal in Central America, but that the plans and surveys made are poor, and new ones should be made. It recommended that a government survey be made and a year and a half be allowed the survey to complete its work. This report was submitted to Congress, Feb. 7, 1896. The party platform adopted by the Republican convention in 1896 urged the completion of the

[1] Amended Dec. 10, 1896.

canal by the government. With this end in view, the United States government, in June, 1897, appointed a commission of inquiry into the most practical route to be followed in constructing the canal. Its report was in favor of what is known as the Childs route, from the Pacific to Lake Nicaragua, and the Lull route from the lake to the Caribbean Sea. The estimated cost of construction of this route varies between $118,000,000 and $135,000,000. Congress, in March, 1899, authorized the creating of a new commission to report further anent the Nicaragua route as well as the abandoned Panama route, and in accordance with this President McKinley named nine members, under the chairmanship of Rear-Adm. J. G. Walker, the head of the previous commission. For the expenses of this new inquiry a million dollars were appropriated by Congress, and the new commission is now (Oct., 1900) actively at work. The practical issue of the commission, whatever it may be, is, however, not wholly one of engineering difficulty and financial cost. Hitherto there were questions to be settled by diplomacy as to the neutrality of the canal in the case of international war, and the right of the United States to land marines and a military force to guard it against alien foes, as well as native revolutionists, in the event of American capital being raised to construct, control, and operate it. These, by the Hay-Pauncefote treaty, have now been amicably settled between the specially interested governments of the United States and Great Britain; though the recent offer by the French owners of the Panama canal has put a new aspect on the project. For a description of the engineering details, see CANAL, Vol. IV, p. 701; and CANAL, in these Supplements.

NICENE COUNCIL. See COUNCIL, Vol. VI, pp. 452–455; also CREEDS, Vol. VI, pp. 495, 496.

NICHOL, JOHN, a British littérateur; born in Montrose, Scotland, Sept. 8, 1833. He was professor of English literature at Glasgow University (1861–89), and contributed to the leading British reviews and to this ENCYCLOPÆDIA. His article on AMERICAN LITERATURE, in Vol. I, pp. 630–644, has been published separately. He also published *Hannibal*, a drama (1872); *Byron*, in the English Men of Letters Series (1880); *Robert Burns* (1882); *Bacon*, in English Philosophers (1888); and *Lord Bacon's Life and Philosophy* (1889). He died in London, Oct. 11, 1894.

NICHOLAS II, Czar of Russia; born in St. Petersburg, May 18, 1868. He succeeded to the throne Nov. 1, 1894, and was crowned formally May 26, 1896. His father was Czar Alexander III, and his mother a daughter of the King of Denmark. He was president of the Committee of Succor during the Russian famine of 1891. He was married, Nov. 26, 1894, to Princess Alix of Hesse-Darmstadt. The coronation ceremonies were attended by representatives of almost every government on the globe. The young Czar immediately evidenced a tendency to deal liberally with all classes of his subjects. In September, 1896, the Czar and Czarina started upon a journey which included the principal courts and nations of Europe. Everywhere they were greeted with enthusiastic cordiality, but especially in France.

NICHOLAS NICOLAIEVITCH, Grand Duke of Russia, brother of Tsar Alexander II, was born in Tsarskoïë Selo, Aug. 8, 1831. He entered into active service at the age of 16. Nominated a general and inspector-general of engineers, he was commander-in-chief of the army, having General Todleben as his assistant. In the war against Turkey he received the chief command of the army of the Danube, which invaded Roumania, April 24, 1877. In April, 1878, he resigned the chief command of the Russian army before Constantinople, and was succeeded by General Todleben. He was afterward field-marshal and aide-de-camp to the Czar. He became insane in October, 1890, and remained in that condition until his death, in St. Petersburg, April 25, 1891.

NICHOLASVILLE, a city and the county seat of Jessamine County, Kentucky, in the central part of the state. It lies in a fertile farming and stock-raising region, a few miles north and east of the Kentucky River and twenty-eight miles southeast of Frankfort, and is reached by the Cincinnati, New Orleans and Texas Pacific and the Richmond, Nicholasville, Irvine and Beattyville railroads. Its population in 1900 was 2,393. W.F.J.

NICHOLS, EDWARD LEAMINGTON, an American educator; born of American parentage at Leamington, England, September 14, 1854. He was graduated from Cornell in 1875 and studied at Leipsic, Berlin and Göttingen until 1879. In 1880 he was an assistant to Thomas A. Edison at Menlo Park, N. J., and in the following year was professor of physics and chemistry at the Central University of Kentucky. From 1883 to 1887 he was professor of physics and chemistry at the University of Kansas. For some years he was editor of the *Physical Review*. He has written *The Galvanometer; Manual of Physics and Applied Electricity; The Elements of Physics; Outlines of Physics*, and other works on chemistry; and has contributed to various scientific journals. W.M.C.

NICHOLSON, MRS. ELIZA JANE, pseudonym "Pearl Rivers," an American journalist; born near Pearl River, Mississippi; the daughter of J. W. Poitevent. She contributed verses to *Lippincott's* and other periodicals under her pseudonym. A volume of her poems was published in 1873. She was given a position on the New Orleans *Picayune* by A. M. Holbrook, the proprietor of the paper, whom she afterward married. Upon his death she became sole owner of the *Picayune*, and afterward married George Nicholson, the business manager. She died in New Orleans, Feb. 15, 1896.

NICHOLSON, HENRY ALLEYNE, a British scientist; born in Penrith, Cumberland, Sept. 11, 1844, and educated at the Universities of Göttingen and Edinburgh. He was appointed professor of natural history and botany in the University of Toronto in 1871; professor of natural history in the University of St. Andrew's in 1875, and in 1882 regius professor of natural history in the

University of Aberdeen. He published scientific works, chiefly geological and palæontological, including *Geology of Cumberland and Westmoreland* (1866); *Palæontology of Ontario* (1875); and *Textbook of Zoölogy*. Died in Aberdeen, Jan. 19, 1899.

NICHOLSON, James William Augustus, naval commander, was born at Dedham, Mass., on March 10, 1821, and entered the navy in 1838. He was a member of Perry's expedition to Japan. In the Civil War he was sent to the relief of Fort Sumter, was in the attack on Port Royal, served on the Potomac River, helped capture Fernandina, St. Augustine and Jacksonville, commanded the monitor *Manhattan* at Mobile Bay and helped to cripple the ram *Tennessee*, and was the captor of Fort Morgan. With his ship *Lancaster* he gave protection to many refugees at the bombardment of Alexandria, Egypt, in 1882. He was made rear-admiral in 1881, and died on October 28, 1887. W.F.J.

NICHOLSON, John, a British soldier; born in Dublin, Dec. 11, 1822. In 1838 he joined the East Indian Company's service, and in 1840 was ordered to Ghazni, in Afghanistan. On the breaking-out of the Sikh war he served in the campaign on the Sutlej, and was present at the battle of Ferozeshah. During the Sikh rebellion he greatly distinguished himself by his daring and promptitude. The Punjab having finally become a British province, Captain Nicholson was appointed a deputy-commissioner under the Lahore board. In the mutiny in 1857 Nicholson did more than any other man to hold firm the British grasp of the Punjab. He suggested the formation of the famous "flying column," and supervised over its organization. As brigadier-general he led the first column of attack at the siege of Delhi, and after the troops had forced their way into the city he still exposed himself in the most fearless manner, and fell, shot through the body, Sept. 23, 1857.

NICKEL CARBONYL. See Chemistry, in these Supplements.

NICKEL–STEEL. See Iron and Steel, in these Supplements.

NICKERSON, a city of Reno County, central Kansas, 10 miles N.W. of Hutchinson, on the Atchison, Topeka and Santa Fé railroad; is in a grain and stock-raising district, and has the railroad round-house and repair-shops. Population 1890, 1,662; 1900, 1,038.

NICOL, Erskine, painter; was born in Leith, Scotland, on July 3, 1825; lived in Dublin in 1843–46, and in London after 1862. He excelled in painting homely scenes of Irish and Scotch life. He was a member of the Royal Society of Artists, and from 1866 to 1885 an associate of the Royal Academy. A number of his works are in well-known American galleries. He died on March 8, 1904. W.F.J.

NICOLAY, John George, an American author and public man; born in Essingen, Bavaria, Feb. 26, 1832. He learned the printer's trade in Pittsfield, Ill., and later became the editor and proprietor of the Pittsfield *Free Press*, on which he had acquired his experience. He was private secretary to Abraham Lincoln from 1860 to 1865; United States consul at Paris from 1865 to 1869; and marshal of the United States Supreme Court from 1872 to 1887. His principal literary works are: *Abraham Lincoln: a History* (10 vols., 1890); and *Abraham Lincoln's Complete Works* (2 vols., 1894) (both with Col. John Hay). He has also written many magazine articles. He died in Washington, D. C., Sept. 26, 1901. E.E.T.

NICOLINI, Signora. See Patti, Adelina M. C., in these Supplements.

NICOLLET, Jean Nicolas, a French scientist; born in Savoy about 1786. He was the friend and pupil of Laplace, who makes frequent mention of him in his *Mécanique Céleste*. He came to the United States in 1833 for scientific study and exploration of the country, especially of the Red, Arkansas, Mississippi, and Missouri river basins. He collected many ethnological, historical, linguistic, and physiographical data concerning America and its products. He was employed by the War Department to make further researches in the far West, and on this expedition he was accompanied by Frémont. He made several geological reports, and a map which was published by order of Congress. He died in Washington, D. C., Sept. 11, 1843. E.E.T.

NICOLLS, Sir Richard, a British colonial governor of New York; born in 1624, in Amptthill, England. He served in the British army until 1664, attaining the rank of captain. He was sent to America in 1664 as the representative of Charles II, to take possession of the New Netherlands and to act as arbitrator between the other colonies. He landed on Long Island, Aug. 25, 1664, and immediately took formal possession, compelling the Dutch under Stuyvesant to take the English oath of allegiance. He governed the colony until Aug. 25, 1668, when he engaged in the naval war with Holland and was killed in battle with Admiral De Ruyter, May 28, 1672. While governor of New York he changed the name of the colony from New Netherlands to New York, and gave the names to the lower counties and Hudson River cities. He was popular both among the English and Dutch settlers.

NICOSIA or LEFKOSIA, the capital city of Cyprus, and situated in the north central part of the island, on the right bank of the river Pedias, 23 miles N.W. of the port of Larnaka. It has manufactures of carpets and leather goods, and a trade in cottons and wines. Population 1901, 14,752. For extended article, see Nicosia, Vol. XVII, p. 504.

NICOTIANA. See Tobacco, Vol. XXIII, pp. 451–455.

NICTHEROY, Brazil, the capital of the state of Rio de Janeiro, a town on Praia Grande Bay, an inlet at the mouth of the Bay of Rio de Janeiro, opposite the seaport town of that name. It is a residential and suburban bathing resort with manufactures of war materials. Pop., 36,000. C.L.S.

NIEL, Adolphe, a French marshal; born in

Muret, Oct. 4, 1802. He entered the army as an engineer officer; took part in the storming of Constantine in Algeria, the siege of Rome, the bombardment of Bomarsund in Finland, the fall of Sebastopol, and in the battles of Magenta and Solferino. His share in these battles won him the marshal's baton. He was made Minister of War in 1867, and was employed in reorganizing the French army when he died, Aug. 14, 1869. It was in honor of him that the Marechal Niel rose received its name.

NIEMEN OR MEMEL RIVER. See RUSSIA, Vol. XXI, p. 80.

NIEMEYER, JOHN HENRY, an American artist; born in Bremen, Germany, 1839. He was taken when a child by his parents to the United States. He studied in Paris, and in 1871 became professor of drawing in the Yale School of Fine Arts. He exhibited portraits and genre pictures in New York. Perhaps his best-known work is *Guttenberg Inventing Movable Type* (1869).

NIERSTEIN, a village of the Grand Duchy of Hesse, in Germany, on the Rhine, 10 miles S.E. of Mainz; famous for its wines. Population, 4,000.

NIETZSCHE, FRIEDRICH, a German author; born in 1844, in the village of Röcken, on the historic battle-field of Lützen. His ancestry, probably of Slavonic origin, a proud, pretentious race, settled in Saxony during the eighteenth century. Friedrich, being left an orphan at an early age, was fortunate in receiving a superior education, concluding his studies at Bonn and Leipsic. Although intended for the ministry, Nietzsche's rebellious spirit soon led him to renounce all faith in Christianity, on the ground that it impeded the free expansion of life. Turning his attention to Oriental studies, he became noted as an acute and comprehensive philologist, receiving the offer of a professorship in the University of Basel, Switzerland, a position he filled with great credit, although his heterodox, not to say revolutionary, opinions occasioned no little dismay among his staid and pedantic colleagues. He was at this period of his career strongly influenced by Schopenhauer and Richard Wagner, the latter being for a while his intimate personal friend. His radical doctrines found early expression in *The Old Faith and the New* and *The Value of History for Life*, written at this time. In 1876 incessant labor, together with extreme nervousness engendered by an uncongenial environment, induced brain and eye affections, compelling Nietzsche to relinquish his duties as instructor. Being retired on a pension, he was reduced to the condition of an invalid, spending his summers in Switzerland and in winter visiting the shores of the Mediterranean. His physical sufferings may be inferred from his own confession that the year contained for him two hundred days of pure and unadulterated pain. Yet it was during this interval of excruciating headaches, when the shadow of final eclipse was creeping upon his intellectual faculties, that he produced the works destined to rivet the attention of philosophical minds, recalling the perfectionist theories of all ages, mingled with the pessimism of Schopenhauer, and fired with an iconoclastic ardor surpassing the wildest dreams of contemporary free thought. His doctrines, however, as embodied in the *über-mensch* ("the over-man)," are inspired with human interest and lofty aspirations, while in brilliancy of thought and diction and in epigrammatic force the writings of Nietzsche command admiration. In rapid succession he poured forth his works, amid the most distressed circumstances. *Human, all too Human*, appeared in 1879, quickly followed by *Dawn of Day; The Joyous Science* (1882); *So Spake Zarathrustra* (1883–85), perhaps the most remarkable of his works; *Beyond Good and Evil* (1886); *The Genealogy of Morality* (1887); *The Case of Wagner* (1888), from whom he had unaccountably become estranged; *Twilight of the Idols* (1888); etc. But the tension induced by this surprising fertility of brain had been too great; the cord snapped suddenly, and Nietzsche became hopelessly insane. Yet, notwithstanding the pathetic close of his literary life and the evident traces in his works of an intellect already clouded by approaching doom, the germs of Nietzsche's philosophy have awakened in Germany a profound interest, even among his most pronounced antagonists, the constructive element in his writings, as well as their fearless iconoclasm, marking the author as the chief apostle of modern rationalism in its extreme, possibly aberrant, phase. He died at Weimar, Aug. 25, 1900.

NIGER DISTRICT PROTECTORATE. See AFRICA, in these Supplements.

NIGHT-HAWK, a popular name for North American birds of the genus *Chordeiles*, belonging to the family of goatsuckers. They are often seen during twilight flying to a great height and then making a sudden downward rush, at the same time giving a sharp, rasping cry. They are valuable insectivorous birds.

NIGHTINGALE, FLORENCE, a British army nurse, the daughter of William Edward Nightingale, of Embley Park, England; born in Florence, in May, 1829. She early exhibited an intense devotion to the alleviation of suffering, which, in 1844, led her to give attention to the condition of hospitals. She visited and inspected civil and military hospitals all over Europe; and in 1851 went into training as a nurse. In 1854 war was declared with Russia, and the hospitals on the Bosphorus soon were crowded with sick and wounded. In this crisis Miss Nightingale offered to go out and organize a nursing-department at Scutari. Lord Herbert accepted her services, and she departed with thirty-four nurses.

FLORENCE NIGHTINGALE.

She arrived at Constantinople November 4th, on the eve of Inkermann, in time to receive the wounded into wards already filled with 2,300 patients, and a few months after her arrival she had 10,000 sick men under her care. In 1855, while in the Crimea, she was prostrated with fever, but refused to leave her post, and on her recovery remained at Scutari till Turkey was evacuated by the British, July 28, 1856. At the close of the Crimean War a fund of $250,000 was subscribed for the purpose of enabling her to form an institution for the training of nurses; this is spent in connection with St. Thomas's (the Nightingale Home) and at King's College Hospital. In 1858 she published valuable *Notes on Nursing*. The *Notes on Hospitals* (1859), from the clearness of arrangement and minuteness of detail, are valuable to the architect, the engineer and the medical officer. In 1873 appeared *Life or Death in India* and *A "Note" of Interrogation*, the latter making a great impression because of her mode of handling matters relating to religious belief and life. Longfellow lauded her in *Santa Filomena*. *Revised by* R.C.A.

NIHILISTS, Nihilism. See Socialism, Vol. XXII, pp. 228, 229.

NIKON, a Russian patriarch and primate; born in 1605 and died in 1681. He became patriarch of Moscow in 1652, and so changed the church services as to cause a secession of part of the members. See Russia, Vol. XXI, pp. 90, 113.

NILES, a city of Berrien County, southwestern Michigan, 21 miles S.S.E. of St. Joseph and 90 miles E. of Chicago, on the Cleveland, Cincinnati, Chicago and St. Louis and the Michigan Central railroads; has excellent water-power and important manufactures; flour and feed, straw paper, wood-pulp and furniture are extensively produced. It is in an agricultural district, and ships fruit and live-stock. Population 1890, 4,197; 1900, 4,287.

NILES, a city of Trumbull County, northeastern Ohio, on the Mahoning River, and on the Youngstown and Pittsburg and the Lake Erie railroads; one of the largest iron-manufacturing towns in the state, having blast-furnaces, nail-works, machine and boiler shops and rolling-mills. The vicinity abounds in coal, and the city is situated in the center of a rich dairying country. Population 1890, 4,289; 1900, 7,468.

NILES, Hezekiah, editor and author; was born in Chester County, Pennsylvania, on October 10, 1777. He became a printer, wrote humorous essays under the title of *Quill-Driving*, published the *Evening Post* in Baltimore, and in 1811 founded a uniquely valuable periodical called *Niles's Register*, which he continued to edit and publish until 1836. It became well known throughout the world, and to this day is one of the richest mines of historical data in existence for the period which it covers. In 1836 he turned the paper over to his son, William Niles. Mr. Niles wrote *Principles and Acts of Revolution in America*. He died on April 2, 1839. W.F.J.

NILOMETER, an arrangement for measuring the height of the Nile in Egypt. On the Island of Rhoda, opposite Cairo, is a square well, connected with the river by a canal and containing a graduated marble pillar, divided into 24 cubits, each measuring 21.386 inches. See Egypt, Vol. VII, p. 612.

NILSSON, Christine. See Miranda, Countess of, in these Supplements.

NILSSON, Sven, a Swedish naturalist and archæologist; born near Landscrona, Sweden, March 8, 1787. In 1812 he became instructor in natural history, and afterward overseer of the Zoölogical Museum. From 1831 to 1856 he was professor of zoölogy at Lund. His chief scientific publications are *Ornithologia Suecica* (2 vols.), and *Skandinavisk Faunä* (4 vols.). His most important archæological work is *Skandinaviska Nordens Urinnevanare* (4 vols., 1838–43). He died in Lund, Nov. 30, 1883.

NIMRUD, an ancient city. See Nineveh, Vol. XVII, pp. 525, 526.

NIOBRARA FORT, a United States military post (Department of the Platte) in Cherry County, northern Nebraska, on the Niobrara River; post-office and telegraph station at the post; railroad station at Valentine, 4½ miles W. on the Fremont, Elkhorn and Missouri Valley railroad. The post is situated in a reservation covering 540 square miles; has accommodations for 25 officers, six troops of calvary and three companies of infantry, and in 1895 was garrisoned by seven companies of infantry. Fort Niobrara has played an important part in several Indian outbreaks, owing to its nearness to the reservations in South Dakota.

NIOBRARA RIVER. See Nebraska, Vol. XVII, p. 317.

NIPIGON or NEPIGON. See St. Lawrence, Vol. XXI, pp. 186, 187; and Nepigon, in these Supplements.

NIPISSING, a lake in the province of Ontario, Canada, near the northeast side of Lake Huron, nearly midway between it and the Ottawa River. It contains many islands, upon one of which a summer hotel has been constructed. It discharges its waters into Georgian Bay by French River. Length, 50 miles; breadth, 14 miles; altitude, 599 feet.

NIPPON or DAI-NIPPON, the Japanese name for Japan. See Japan, Vol. XIII, p. 578.

NIPPUR, an ancient Babylonian city discovered by the expedition sent out by the University of Pennsylvania, which began excavations in the old mound of Nippur (located by Sir Austen Layard about 1850), about 50 miles S.E. of Babylon, in Feb., 1889. The work was begun under the direction of Dr. John P. Peters, and in 1894–96 was carried on under himself, Mr. J. H. Haynes, and Professor Hilprecht. In 1895–96 the work had resulted in discoveries which, it has been alleged, supply the world with history antedating any ever before received. Prior to this, the earliest Babylonian kings of whom we have possessed accounts were Sargon I and his son, Naram-Sin, 3800–3750 B.C. Beneath the walls and pavements constructed by

these monarchs, excavations have revealed the walls and foundations of an older city. Pottery and inscribed tablets have been found, upon which the cuneiform inscriptions indicate, according to Professors Peters and Hilprecht, that the world, at 7000 B.C., had a civilization; that Babylonia was old and wise when the shepherd kings or pyramids of Egypt were young and new. Their computation rests upon the time taken in the accumulation of strata and in developing a system of cuneiform writing. A large collection of relics was brought to the University of Pennsylvania.

NIRVANA, The Buddhist Doctrine of. See Buddhism, Vol. IV, p. 388.

NITOCRIS, a queen of ancient Egypt. See Egypt, Vol. VII, pp. 636, 670.

NITRATE COMPOUNDS. See Gun-Powders, in these Supplements.

NITRATE OF AMYL, a powerful drug used as an anti-spasmodic in affections of the chest. It is formed by the action of nitric acid or fusel oil, and its chemical representation is $C^5A^{11}NO^2$. In 1865 Sir Benjamin W. Richardson discovered its control over tetanus and other spasmodic affections. It is a volatile, yellowish liquid, having a fragrance like bananas, and on inhalation it produces violent arterial action in the head and neck, which quickly passes away. It is useful in some forms of asthma, in *agina pectoris* and other spasmodic symptoms arising in the vaso-motor system.

NITRIC ACID. See Chemistry, Vol. V, pp. 442–444.

NITRIFICATION, a process carried on by certain peculiar bacteria of the soil, known as nitrobacteria, by which they oxidize ammonia compounds to nitrites and these to nitrates, the form in which nitrogen material is usually absorbed by plants. The nitrobacteria are peculiar among plants, in that they have the power of producing organic substance without the aid of chlorophyll and light. It is by the oxidative process known as nitrification that they obtain the necessary supply of kinetic energy.

NITRIFICATION, the changing of nitrogenous organic matter or ammonia compounds into nitrates. Under certain conditions, nitrification goes on in every fertile soil, the atmospheric nitrogen, nitrogenous organic matter, or ammonia compounds being converted, in the presence of lime or potash, into the corresponding *nitrates* of lime or potash; and from these compounds plants derive the most or all of their nitrogen, although some observers maintain that many plants obtain part at least of their nitrogen from ammonia. The oxidation of the nitrogen takes place through the agency of certain organisms called "nitrifying ferments."

NITROBENZOL, a chemical compound. See Aniline, Vol. II, pp. 43, 44.

NITRO-HYDROCHLORIC ACID. Same as Aqua Regia, q.v., in these Supplements.

NITROMETER. A chemical apparatus for determining the quantity of niter, nitric acid or some other combination of nitrogen in a mixture. The preferred form is a tube bearing two bulbs; one is placed immediately below a filtering-funnel and is connected with an absorption-tube. The other bulb is connected and surmounted by a graduated absorption-tube. C. H. Cochrane.

NITROUS ANHYDRIDE. See Chemistry, in these Supplements.

NITROUS ETHER or NITRITE OF ETHYL, a very volatile ether, with an agreeable apple odor and highly inflammable. In itself it is of little importance, but on account of its relation to the *sweet spirits of niter* or *spirit of nitrous ether*, is one of the most important drugs. The sweet spirits of niter contains in addition aldehyde and paraldehyde, and it is believed that to these we must ascribe much of its virtue. It is used, in conjunction with other medicines, as a diuretic, especially in the dropsy which follows scarlatina; and it is employed, in combination with acetate of ammonia and tartarized antimony, in febrile affections.

NITROUS OXIDE or LAUGHING-GAS. See Chemistry, Vol. V, pp. 443, 445.

NIZA or NIZZA, Marcos de, an Italian-American explorer and missionary; born in the fifteenth century, probably in the last quarter. He became a Franciscan monk, went to the West Indies in 1531, and took part in the conquest of Peru. He afterward, with two companions, explored the Northwest into New Mexico, and went with Coronado on his famous expedition. His account of the discoveries of his first trip were so far from true that when Coronado's men learned the truth, and that the country was not rich in gold, it was with difficulty that Coronado protected Niza. Niza went back to Mexico alone, and died there in 1542.

NIZHAN. See Nyezhin, Vol. XXVIII, p. 268.

NO or NO-AMON, a city of ancient Egypt. See Vol. VII, p. 673.

NOBLESVILLE, a city, the capital of Hamilton Co., Ind., 20 miles N.N.E. of Indianapolis, on the White River, and on the Chicago and Southeastern and the Lake Erie and Western railroads; the trade-center of a farming region; has iron-works, lumber-mills, strawboard, novelty, and carbon works. Population 1890, 3,054; 1900, 4,792.

NOCTILIONES, a family of bats. See Mammalia, Vol. XV, pp. 417, 418.

NODES, Line of. See Astronomy, Vol. II, p. 674.

NOGENT-LE-ROTROU, a town in the department of Eure-et-Loir, France, prettily situated on the Huisne, 32 miles W. by S. of Chartres and 93 miles S.W. of Paris. It is a well-built place, with the ruined château of the great Sully, his violated sepulcher, and a statue of General Saint-Pol, who fell before Sebastopol. The Germans here won two fights, in 1870 and 1871. Population, 7,346.

NOISSEVILLE, a village of France, in the department of Meurthe-et-Moselle, about five miles from Metz; an important place during the Franco-Prussian War, several large battles having taken place here, principal among them the engage-

ment in which Manteuffel defeated the army of General Bazaine, Sept. 1, 1870.

NÖLDEKE, THEODORE, a German Orientalist; born in Harburg, March 2, 1836. He studied at Vienna, Leyden, Berlin and Göttingen, where he graduated in 1861. In 1864 he was made professor extraordinary at Kiel, and in 1868 professor ordinary. In 1872 he accepted the professorship of Semitic languages at the newly established University of Strasburg. He published *Geschichte des Korans* (1860); *Grammatik der Neusyrischen Sprache* (1868); *Untersuchungen zur Kritik des Alten Testaments* (1869); *Mandäische Grammatik* (1875); *Geschichte des Perserreiches zur Zeit der Sassaniden* (1879); *Syrische Grammatik* (1880); *Aufsätze sur Persischen Geschichte* (1887); *Beiträge zur Geschichte des Alexandersromans* (1890); *Orientalische Skizzen* (1892). He also wrote numerous articles for this ENCYCLOPÆDIA, including those on KORAN (Vol. XVI, pp. 619–628); PAHLAVI (Vol. XVIII, pp. 139–140); PERSIA (*Anc. History*, Vol. XVIII, pp. 573–627); and SEMITIC LANGUAGES (Vol. XXI, pp. 673–688).

NOLHAC, PIERRE DE, a French writer; born in Ambert, Puy-de-Dôme, Dec. 12, 1859; in 1882 was admitted to the French school at Rome, where he remained three years. Upon his return to France he took the degree of doctor of letters, and was attached to the Bibliothèque Nationale at Paris, and was appointed in 1886 a professor at the École des Hautes-Études. After occupying the position of assistant curator of the Versailles Museum, he succeeded to the curatorship in 1892. He devoted his studies chiefly to the history of Italian and French renaissance, a list of his works including *Lettres de Joachim du Bellay* (1883); *La Bibliothèque d'un Humaniste* (1883); *Les Collections d'Antiquités de Fulvio Orsini* (1884); *Le Canzoniere Autographe de Pétrarque* (1886); *Petites Notes sur l'Art Italien* (1887); *La Bibliothèque de Fulvio Orsini* (1887); *Érasme en Italie* (1888); *Les Correspondants d'Alde Manuce, Matériaux Nouveaux d'Histoire Littéraire, 1483–1514* (1889); *Pétrarque et l'Humanisme* (1892); *Études sur la Cour de France: La Reine Marie-Antoinette* (1892).

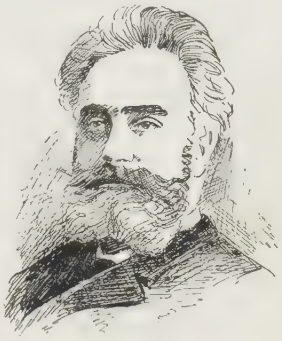
NOME, CAPE, GOLD FIELDS OF. See under ALASKA, and CAPE NOME.

NOMENCLATURE, GEOGRAPHICAL. See GEOGRAPHIC NAMES, BUREAU OF, in these Supplements.

NOMINALISM. See SCHOLASTICISM, Vol. XXI, pp. 436, 437, 447, 448, 449.

NONIUS, MARCELLUS, a Latin grammarian, the dates of whose birth and death are unknown, the nearest that can be said being that he must have lived some time during the period from the second to the sixth centuries. He was the author of an important treatise entitled, *De Compendiosa Doctrina per Litteras ad Filium.* This work is divided into eighteen chapters, the first twelve being in reality separate treatises on different grammatical subjects, while each of the last six contains a list of technical terms referring to some one department. One feature of the work, and one which makes it valuable, consists of the numerous quotations from Latin writers of an earlier date. Three editions have been published by Gerlach and Roth, Basil (1842); L. Quicher, at Paris (1871); and L. Müller, Leipsic (1888).

NORDAU, MAX SIMON, a Hungarian physician and author; born in Budapest, July 29, 1849, of Jewish parentage. He studied medicine in his native town and received his doctorate in 1873, and engaged himself in writing for the *Pester Lloyd*, the *Frankfurter Zeitung* and the *Vossische Zeitung*. After traveling in Europe he visited Paris in 1878, and settled there, resuming his medical studies and obtaining a doctor's degree in 1882. He continued his journalistic and literary labors, publishing political and social criticism. He then wrote some works which received wide attention and were translated into the English language. These are known by their English titles as *Paris Pictures* (1880); *Conventional Lies* (1883), dealing with religion, politics, economics, matrimony, etc., which was suppressed in Austria; and *Paradoxes* (1885), a philosophical study. In 1887 he published *The Malady of the Century*, a novel. Then appeared *Entartung* (1893), the work which brought him into greater prominence, translated and known to English readers as *Degeneration* (1895), in which he endeavored to prove that the intellectual activity and excitement of the last half-century have resulted in the degeneration of a once healthy mental condition into maudlin and emotional sentimentality and salacious impurity. Others of his works are *The Comedy of Sentiment* (1892); *The Right to Love* (a drama, 1894); *The Ball* (a drama, 1895); and *The Battle of the Drones* (1896).



MAX NORDAU.

NORDENSKJOLD, BARON ADOLF ERIK, a Swedish, naturalist and explorer; born in Helsingfors, Finland, Nov. 18, 1832. He first went to the gymnasium at Borgo, and on entering the University of Helsingfors in 1849 devoted himself almost entirely to scientific studies, spending his vacations in excursions to the rich mineral localities of Finland. He soon became eminent in this particular branch of science. He settled in Sweden, and in 1851 first entered on his Arctic travels by accompanying Torell to Spitzbergen. (For descriptions of three subsequent expeditions, see POLAR REGIONS, Vol. XIX, pp. 335–338.) In recognition of his services he was created a baron in April, 1880, and named a commander of the Legion of Honor and a foreign knight of the Prussian Ordre pour le Mérite for Arts and Sciences. Died Aug. 12, 1901.

NORDHAUSEN, a town of Prussia. Population 1900, 35,000. See NORDHAUSEN, Vol. XVII, p. 548.

NORDHOFF, CHARLES, journalist, was born in Germany on August 31, 1830, was brought to

America at the age of four years, and was apprenticed in a printing office. He spent several years at sea, and in 1853–57 was employed in various newspaper offices. In 1857–61 he was connected with *Harper's Weekly* and *Harper's Magazine*, in 1861–72 with the New York *Evening Post*, and in 1874–90 with the New York *Herald* as its Washington correspondent. In 1890 he retired from active work on a pension granted by the *Herald*. He was the author of a number of books which were widely read, including *Man-of-War Life*, *The Merchant Vessel*, *Whaling and Fishing*, *Stories of the Island World*, *Secession Is Rebellion*, *The Freedmen of the South Carolina Sea Islands*, *Slavery Injurious to Free Laborers*, *Cape Cod and All Along Shore*, *California for Health, Pleasure and Residence; Northern California, Oregon and the Sandwich Islands; Communistic Societies of the United States*, *The Cotton States Under Reconstruction*, *Politics for Young Americans*, *Peninsular California*, and *God and the Future Life*. His *Politics for Young Americans* has been translated into Spanish, and is used as a text-book in Mexican schools. He died in California on July 14, 1901. W.F.J.

NORDICA, Madame Lillian. See Dome, Mrs. Z. F., in these Supplements.

NORFOLK, a city of Madison County, northeastern Nebraska, 17 miles N. of Madison, on the Chicago, St. Paul, Minneapolis and Omaha and the Fremont, Elkhorn and Missouri Valley railroads; has a foundry and machine-shop, cannery, creamery and beet-sugar factory, and is an important shipping-point. The surrounding country is devoted to grain and stock raising. The North Nebraska Insane Asylum is here. Population 1890, 3,038; 1900, 3,883.

NORFOLK, a city and port of entry of Virginia, on the right bank of the Elizabeth River, 8 miles from Hampton Roads. Its large harbor is defended by two forts. Norfolk ships considerable quantities of cotton, oysters, and early fruits and vegetables; lines of steamers connect it with New York and other cities. Pop. 1890, 34,871; 1900, 46,624. See Norfolk, Vol. XVII, p. 551.

NORFOLK, Henry Fitzalan Howard, Duke of, premier Duke and Earl of England, and holds besides these titles those of Earl of Arundel, Surrey and Norfolk; and Baron Fitzalan, Clun, Oswaldestre and Maltravers; and is hereditary Earl Marshal and Chief Butler of England. He was born in London, Dec. 27, 1847; and succeeded to the peerage on the death of his father, the fourteenth duke, Nov. 26, 1860. The Duke is a Roman Catholic, and in 1887 was charged with a special mission from Queen Victoria to the Pope on his jubilee. He was elected mayor of Sheffield, and in 1895 was appointed Postmaster-General in Salisbury's cabinet.

NORMAL, a town of McLean County, Illinois, in the central part of the state. It lies just north of Bloomington, of which it is a suburb, at the intersection of the Illinois Central and the Chicago and Alton railroads. It was founded in 1857 as the seat of the Illinois State Normal School, from which institution it takes its name, and is also the seat of a home for soldiers' orphans. Its population in 1900, apart from the normal school, was 3,795. W.F.J.

NORMAL SCHOOLS, institutions in which the students are trained to become teachers. The students are young men or women, generally between 17 and 20 years of age, who have passed through a grammar-school, or even a superior school, and who have passed an examination in reading, writing, grammar, arithmetic, and in the geography of their own country. Most normal schools in the United States were modeled after those of the state of Massachusetts, and most of the European normal schools took those of the kingdom of Prussia as their patterns. According to the returns made to the Bureau of Education in 1899, about half of the students pursuing teachers' training were in public normal schools, the number being 56,279. There were 166 public schools, 2,750 instructors, 11,543 male students, 33,265 female students, and 8,948 graduates. Among the total number of normal students were 1,138 negro students, in normal schools of that race. Sixty-one per cent of the students in the public normal schools were in the teachers' training-courses. Besides these public schools, there were 749 private institutions.

In the American normal schools the studies first attended to are those which the law of the respective state requires to be taught in the district schools, namely: orthography, reading, writing, English grammar, United States geography, and arithmetic. When these are mastered, studies of a higher order are progressively taken up. Those pupils who take the full course of three years are in addition instructed in composition, rhetoric, logic, penmanship and drawing, higher arithmetic, algebra, geometry, book-keeping, surveying, ancient and modern geography, chronology, general history, human physiology and hygiene, mental and natural philosphy, history of the United States, natural history, astronomy, music—and, above all, the science and art of teaching with reference to all the above-named studies.

NORMAN, a town and the county seat of Cleveland County, Oklahoma, in the southern part of the territory. It lies just north of the Canadian River, and is reached by the Gulf, Colorado and Santa Fé railroad, forty-five miles south of Guthrie. It is in an agricultural region, and is the seat of the University of Oklahoma (q. v.). Its population in 1900 was 2,225. W.F.J.

NORMAN, Henry, an English journalist and author; born in Leicester, in 1857; educated in Paris and at Harvard University, where he graduated in 1881, and took a two-years' post-graduate course at Leipsic. He then was engaged on the *Pall Mall Gazette*, London, for four years, and, on account of his proficiency in languages, was sent on several important missions abroad. Having inherited a small fortune, in 1888 he began to travel in the far East, visiting China, Siberia, Korea, Japan, Tonquin and Malaya; he visited the Franco-Chi-

nese frontier, crossed Korea on horseback, exploring a hitherto unknown portion of the Malay peninsula, being the first European to pass through the upper part of the closed native state of Kelantan. He became in 1892 a member of the editorial staff of the *Daily Chronicle* of London; was put in charge of the literary page, and in 1895 became assistant to the editor-in-chief, H. W. Massingham. He was sent to Constantinople to report on the Armenian atrocities; and from there, in 1895, he proceeded to Washington, District of Columbia, to ascertain the facts as to the Monroe doctrine. He made an exhaustive investigation of the matter, and was able to throw much light upon the subject. On his return to London from his Eastern travels he married Menie Muriel Dowie, who had traveled alone in masculine attire through the wildest parts of Europe, and who published an account of her experiences in a work entitled *A Girl in the Carpathian Mountains*. Mr. Norman published several works, his first appearing the year of his graduation at Harvard. Its title was *The Performance of Œdipus Tyrannus at Harvard*, which was followed later, as the result of his traveling, with *The Real Japan* (1891); *The Peoples and Politics of the Far East* (1894); and *Round the Near East* (1895).

NORMAN, Sir Henry Wylie, a British general; born in London, in 1826; achieved distinction as a soldier in India and afterward in the British civil service. He entered the Bengal army as an ensign in 1844, and served through the Punjab campaign in 1848. He was at the battles of Chillianwallah and Goojerat, and commanded a detachment in the Sonthal campaign. Throughout the Indian Mutiny he was a conspicuous figure. He was appointed assistant military secretary at the Horse Guards in 1860, and from 1862 to 1870 he was military secretary to the government of India, and afterward for seven years military member of the Viceroy's council. From 1878 to 1883 he was at the India office as military member in the council of the Secretary of State, and then he began his later civil career as governor of Jamaica. In 1889 he assumed the governorship of Queensland, and in 1893 he was appointed, as the successor of Lord Lansdowne, Viceroy of India, whose term of office expired in December. This post he at first accepted, but afterward declined. Died October 26, 1904.

NORMAN-NERUDA, Madame. See Hallé, Lady, in these Supplements.

NORNS, a Scandinavian myth. See Aesir, Vol. I, p. 190.

NORONHA, Fernando de, a group of small islands belonging to Brazil. See Fernando de Noronha, Vol. IX, pp. 87, 88.

NORRIS, William Edward, an English novelist; born Nov. 18, 1847, the son of Sir W. Norris, formerly chief Justice of Ceylon. He was educated at Eton, and called to the bar at the Inner Temple in 1874, but did not practice, preferring the profession of literature, and contributing his first serials to *Cornhill*, *Temple Bar* and other magazines. His first novel, *Heaps of Money*, was published in 1877, and there followed *Mademoiselle de Mersac* (1880); *Matrimony* (1881); *No New Thing* (1883); *His Grace; The Countess Radna* (1893); and several other books and serials. His novels are noticeable for their excellence of dialogue, and are generally descriptive of aristocratic society. His series of novels include *Thirlby Hall* (1884); *A Man of His Word* (1885); *My Friend Jim* (1886); *A Bachelor's Blunder* (1886); *Major and Minor* (1887); *The Rogue* (1888); *Miss Shafto; Mrs. Fenton* (1889); *The Baffled Conspirators; Marcia; Mrs. Wentworth's Idea* (1891); *Mysterious Mrs. Wilkinson* (1892); *A Deplorable Affair* (1894); *Mathew Austin; A Victim of Good Luck* (1894); *St. Ann's; A Despotic Lady* (1895); *Clarissa Furiosa* (1897); *The Fight for the Crown* (1898); *The Widower* (1898).

NORRISTOWN, a borough, the capital of Montgomery Co., Pa. See Norristown, Vol. XVII, p. 566. Pop. 1890, 19,791; 1900, 22,265.

NORTH, John Thomas, a British millionaire, familiarly known as "the Nitrate King"; was born in Leeds, England, Jan. 30, 1842, his father being a coal-merchant. From his fifteenth to his twenty-third year he was an apprentice millwright, after which he was a foreman in the Fowler Locomotive Works, Leeds. Upon the death of his father he and his wife emigrated to Chile, where he obtained an appointment as an engineer on a railway at Carrizal. At that time speculation in nitrate was rife in Peru, and he proceeded thither, where he secured certain privileges for supplying the place with drinkable water. These privileges laid the foundation of his vast fortune. He acquired rich deposits of guano and nitrate of soda in the province of Tarapaca, built railroads and ships to transport these products to the Peruvian coast and British ports. He took an active financial part in connection with public works in South America, and after an absence of twenty years returned to England with a fortune estimated at $100,000,000. In January, 1889, he presented Kirkstall Abbey and grounds to his native city, Leeds, and received the freedom of that place January 25th of the same year. He purchased a fine old estate at Eltham, near London, where he entertained lavishly; made handsome gifts to the Leeds Infirmary and to the Yorkshire College of Science. In 1889 he registered his racing-colors, his most fortunate horse being *Nunthorpe*, which in 1891 won the City and Suburban stakes, and followed this up by winning the Jubilee stakes. He was perhaps even better known in the coursing world as the owner of the famous *Fullerton*, winner of the Waterloo cup four times in succession. In 1895 he contested West Leeds as a Conservative against Herbert Gladstone, his canvass being such a farce that the Conservative journals, after his defeat, congratulated the party thereon. He was colonel of the Tower Hamlets Engineer Volunteers. His last speculation was the creating of a vast pleasure-resort at Ostend. He was popular with the Prince of Wales and in society, notwithstanding his many native eccentricities. He died suddenly while presiding over

a meeting of one of his companies in London, May 5, 1896.

NORTH ADAMS, a village of Massachusetts. It has a library, founded in 1884, which has over 15,000 volumes. In 1896 a building valued at $125,000 was presented to the town by A. C. Houghton as a memorial to A. J. Houghton of Boston. Population 1890, 16,074; 1900, 24,200. See NORTH ADAMS, Vol. XVII, p. 568.

NORTHAMPTON, a city and the capital of Hampshire County, Massachusetts, on the Boston and Maine and the New York, New Haven and Hartford railroads. Population 1900, 18,643. See NORTHAMPTON, Vol. XVII, p. 571.

NORTH ATTLEBORO, a manufacturing town of Bristol County, Massachusetts, in the southeastern part of the state, is a center of the jewelry trade. It is reached by the New York, New Haven and Hartford railroad, and had in 1900 a population of 7,253. W.F.J.

NORTH BALTIMORE, a village of Wood County, northern Ohio, 13 miles south of Bowling Green, on the Baltimore and Ohio railroad. It has natural gas, and glass and brick works. Population 1890, 2,857; 1900, 3,561.

NORTH BAY, a town of Nipissing District, northern Ontario, on the Canadian Pacific railroad, 364 miles W. of Montreal. Population 1891, 1,848; 1901, 2,530.

NORTH BROOKFIELD, a town of Worcester County, central Massachusetts, 15 miles W. of Worcester, on the Boston and Albany railroad; has boot and shoe industries; is in a farming and dairy district, and has a library which in 1896 contained 5,128 volumes. Population 1890, 3,871; 1900, 4,587.

NORTH CAPE is the northern extremity of the small island Magerö, Norway, noted as the most northerly land of Europe. It lies in lat. 71° 10′ N. W.F.J.

NORTH CAROLINA has, according to the latest corrected surveys, a gross area of 52,250 square miles, of which 3,670 square miles are water surface and 48,580 square miles, or 31,091,200 acres, are land surface.

The comparisons given below are taken from the twelfth decennial census:

	1890.	1900.
Population	1,617,947	1,893,810
Percentage of increase over preceding census	15.59	17.1
Relative rank in population	16	15
Density of population to the sq. mile	33.30	39.0
Urban population (cities of 8,000 or over)	62,544	96,537
Percentage of urban population of the whole	3.87	5.1
Number of cities 8,000 or over	5	7
Number of male inhabitants	799,149	938,677
Number of female inhabitants	818,798	955,133
Percentage of native-born population	99.77	99.8
Number of negroes	561,018	624,469
Increase of negroes since the preceding census	29,741	63,451
Number of civilized Indians	1,514	5,687

In 1899 North Carolina had 3,771,783 acres devoted to the culture of the cereals, the total production being 41,806,518 bushels. Of the total area, 72.1 per cent was under corn; 19.8 per cent under wheat; 7.2 under oats; 0.9 under barley, under rye, and under buckwheat. The acreage and product of each of the cereals is given below:

PRODUCT.	ACREAGE.	BUSHELS.
Corn	2,720,206	34,818,860
Wheat	746,984	4,342,351
Oats	270,876	2,454,768
Barley	475	4,237
Rye	28,074	133,730
Buckwheat	5,168	52,572

The census reports show that in 1899 North Carolina had in cotton 1,007,020 acres, which produced 216,506,930 pounds, or 459,707 bales of 477 pounds each. The area devoted to cotton was greater than that of 1879 by 253,983 acres an increase of 28.44 per cent; but while this gain in acreage was made, the production was decreased by 16,091,397 pounds, equal to 9.12 per cent. Of the 96 counties of the state, 80 produced more or less cotton, three having over 50,000 acres, 15 less than 1,000 acres; 49 ranged from 1,000 to 25,000 acres, and 13 from 25,000 to 50,000 acres. In the raising of flax the state stood 21 in acreage, 23 in production of seed, 13 in production of fiber, 23 in total value of product, 28 in the average yield of seed per acre, and 24 in the average value of products per acre. In tobacco North Carolina stood 3 in the area devoted and 4 in production, the acreage having been 203,023 and the yield 127,503,400 pounds, an increase of 9,389,045 pounds over the crop of 1889. In the area devoted to rice the position was 4, the acreage 22,279, and increase over 1889 of 10,000 acres. The total production was 7,838,580 pounds, an average of 478 pounds to the acre. The following comparative farm statistics are taken from the reports of the twelfth (1900) decennial census:

	1890.	1900.
Total number of farms	178,359	224,637
Average size of farms, acres	127	101
Total area of farms, acres	22,651,896	22,749,356
Total area of farms, improved	7,828,569	8,327,106
Total area of farms, unimprov'd	14,823,327	14,422,250
Value of lands, fences and buildings	$183,977,010	$194,655,920
Value of implements and machinery	$7,183,210	$9,072,600
Value of live-stock, June 1	$25,547,280	$30,106,173
Value of three items above, total	$216,707,500	$233,834,693
Number of horses	131,451	158,000
Number of mules and asses	100,011	136,000
Number of neat cattle	630,903	587,000
Number of swine	1,251,006	1,300,469
Number of sheep, not including lambs	402,247	208,812
Pounds of wool shorn	733,765	797,176
Pounds of butter	13,129,374	16,913,802
Acres of meadow-land mown	190,754	.....
Tons of hay harvested	191,262	429,824
Bushels of Irish potatoes	1,199,416	1,636,445
Bushels of sweet potatoes	5,665,391	5,781,587

All agricultural interests were rapidly advanced from 1890. The corn crop of 1893 approximated 30,000,000 bushels, and that of 1900, 34,818,860 bushels. The report of the labor commissioner for 1895 gives the number of cotton-mills in the state at 156, which had been increased at the opening of 1896 to 167. The number of looms was near 25,000, the number of spindles approximately 1,000,000. In the mills 4,900 men, 6,150 women and 4,700

STATE SEAL OF NORTH CAROLINA.

children were employed, making a total of 15,750 employees. The capital invested was fully $15,500,000 at the beginning of 1896, and during the preceding year near 125,000,000 pounds of cotton was used.

Much attention has been given since 1890 to truck-farming, and as much as $750,000 worth of produce has been shipped from a single town in one season. Peanuts are extensively grown, North Carolina having been at one time almost the only source of supply of the article in the United States. The culture of the silk-worm has gained a firm hold among the industries of the state, one mill turning out about eighteen thousand pounds of finished product annually. Since 1870 much attention has been given to grape-culture, both for the manufacture of wine and the supply of Northern markets with grapes. The climate is specially adapted to grapes, as is the soil, and vineyards are found in almost all sections. No state in the union has within its boundaries so large a number of the plants used in *materia medica*, the Atlantic slope of the Blue Ridge furnishing near two thousand five hundred varieties. One firm annually ships over two million pounds, the dried herbs, roots and barks going to all parts of the world. In 1900 North Carolina had 7,226 specified manufacturing industries, in which $76,503,894 were invested as capital, 70,570 persons were engaged whose wages annually reached the sum of $13,868,430 and finished products of the value of $94,919,663 were turned out. Prominent among the various industries were cotton goods, yielding $28,372,798; flouring and grist-mill products, $8,867,462; lumber in different forms, valued $17,754,651; fertilizers, $1,497,625; and tobacco in all forms amounting to $13,620,816. Other industries of importance were oil, cotton-seed and cake, carriages and wagons, and foundry and machine-shop products.

The fisheries of North Carolina yielded a return in 1899 of $1,351,944. In 1895 the number of men employed approximated 6,000, the boats and vessels about 2,500. The value of the products is nearly equally divided between sea and river products. The shad and herring fisheries are the most important of any state, and the greater portion of the catch is made in and about the Albemarle Sound. Oysters are abundant, the area of the public grounds exceeding 20,000 acres and the natural beds nearly 5,000 acres. Legislative protection has been thrown around the oyster and fishery interests, and the laws are rigidly enforced.

Reports made in 1900 regarding the public schools of the state give the school population of the preceding year at 490,000 whites and 130,000 colored, the former having 4,603 schools and the latter 2,376. The receipts for school purposes for the year 1901 amounted to $1,119,746. The average monthly salary of white male teachers was $26.33, for colored male teachers, $24.69; for white female teachers, $22.72, and for colored female teachers, $20.14. In 1895 was celebrated the centennial commencement of the State University (q.v., in these Supplements). Normal schools are maintained at several points in the state, that at Greensboro, for girls, having at the commencement of 1899 about 400 students in attendance. At the same time the State College of Agriculture and Mechanic Arts, established in 1889, had about 330 students. At Cullowhee is a normal school under state control, and colored institutions of the same class are in operation at Fayetteville, Salisbury, Goldsboro, Franklinton, Plymouth and Elizabeth City. A summer school for teachers and those preparing to teach is held annually at the University of Chapel Hill.

Of the denominational educational institutions in North Carolina, the Methodist Episcopal Church

CAPITOL BUILDING, RALEIGH, NORTH CAROLINA.

has Trinity College, at Durham, and Livingston College, at Salisbury; the Presbyterian Church, Biddle University, and Charlotte and Davidson Colleges, at Davidson; the Lutheran Church, Lenoir College, at Hickory, and North Carolina College, at Mount Pleasant; the Baptist Church, Wake Forest College, at Wake Forest, and Shaw University, at Raleigh; the Methodist Episcopal South Church, Weaverville College, at Weaverville; the Reformed Church, Catawba College, at Newton; and the Friends Church, Guilford College, at Guilford College.

In 1890 there were in North Carolina 6,824

church organizations, 6,512 edifices and a membership of 685,194, which constituted 42.35 per cent of the population. The value of all church property within the state was $7,077,440. Thirty different denominations were represented, the principal ones being the Baptists, all bodies, with 3,144 organizations; Christians, 158; Disciples of Christ, 186; all Lutheran bodies, 131; all Methodist bodies, 2,413; all Presbyterians, 411; Protestant Episcopal, 178.

The legislature appropriated in 1895 for state institutions, for the two years following, the amounts herewith given: Raleigh Asylum, $141,880, of which $11,390 was a special appropriation; Morgantown Asylum, $200,000, of which $20,000 was special; Eastern Hospital (colored) $95,000, of which $20,000 was special; Deaf and Dumb Institute, at Morgantown, $91,500, of which $21,500 was special; Blind Institute, $80,000; Soldiers' Home, $17,000; Penitentiary, $49,000; State University, $20,000; Normal and Industrial School, $37,500, of which $10,000 was special; Agricultural and Mechanical College, $50,000, of which $30,000 was special; Agricultural and Mechanical College (colored), $10,000; Colored Normal Schools, $13,250; Orphan Asylum, $20,000, and Colored Orphan Asylum, $6,000. In July, 1895, the orphan asylum located at Oxford had 104 inmates, almost evenly divided between boys and girls. The institution is under the control of the Masonic order, and about one half of the expenditures, which average about $10,000 annually, come from the different lodges of the state, from churches and earnings of the asylum. The Raleigh Asylum for the Insane has an average of about 300 inmates, the one at Morgantown about 550, and the Eastern Hospital about the same as the one at Raleigh. The Colored Orphans' Asylum, at Oxford, has about 75 inmates, the state contributing $1,500 annually, which is about one half the expenditures, the remainder coming from churches and charitable institutions.

The receipts from all sources, according to the report of the state treasurer in 1901, were $1,602,676; the disbursements for the same period, $1,685,556. The taxable property of the state was valued at $287,339,288. The per capita state and county taxes amounted to $1.44. Estimates of the total public indebtedness, state and county, place the aggregate (1900) at $6,527,770, or about 25 per cent of the taxable property of the state.

In 1900 the total railroad mileage was reported at 3,696, with a valuation of $24,501,899. The number of persons employed on the different lines aggregated 9,439. The gross earnings amounted to $9,008,054, and the net income to $2,974,475.

North Carolina had in 1895 a National Guard consisting of 32 commissioned officers, 1,462 infantry, 45 cavalry and 175 naval artillery. The entire force formed a brigade, consisting of 28 infantry companies equally divided among four regiments, one troop of mounted riflemen and a battalion of naval artillery. There was also one company of infantry (colored) unattached. The appropriation for the maintenance of the Guard for the year mentioned was $16,000 from the state and $9,500 from the Federal government.

Jan 1, 1899, there were 263 newspapers published in North Carolina, of which 28 were daily, 8 semiweekly, 196 weekly, 1 fortnightly, 8 semimonthly, and 22 monthly. Papers were published in 82 of the 96 counties of the state, in 134 of the cities, towns, and villages, and in 75 county seats.

The following is a list of the principal cities and towns of North Carolina, with their populations as given in the census of 1900: Wilmington, 20,976; Raleigh, 13,643; Charlotte, 18,091; Asheville, 14,694; Winston, 10,008; Newbern, 9,090; Durham, 6,679; Salisbury, 6,277; Concord, 7,910; Fayetteville, 4,670; Greensboro, 10,035; Elizabeth City, 6,348.

The following is a list of the governors of North Carolina from 1776, together with their respective terms of office:

Richard Saswell	1776–79	David L. Swain	1832–35
Abner Nash	1779–81	Richard D. Spaight	1835–37
Thomas Burke	1781–82	Edward B. Dudley	1837–41
Alexander Martin	1782–84	John M. Morehead	1841–45
Richard Caswell	1784–87	William A. Graham	1845–49
Samuel Johnston	1787–89	Charles Manley	1849–51
Alexander Martin	1789–92	David S. Reid	1851–55
Richard Dobbs Spaight	1792–95	Thomas Bragg	1855–59
Samuel Ashe	1795–98	John W. Ellis	1859–61
William R. Davie	1798–99	Henry T. Clarke	1861–62
Benjamin Williams	1799–1802	Zebulon B. Vance	1862–65
James Turner	1802–05	William W. Holden	1865
Nathaniel Alexander	1805–07	Jonathan Worth	1865–68
Benjamin Williams	1807–08	William W. Holden	1868–72
David Stone	1808–10	Tod R. Caldwell	1872–74
Benjamin Smith	1810–11	Curtis H. Brogden	1874–77
William Hawkins	1811–14	Zebulon B. Vance	1877–81
William Miller	1814–17	Thomas J. Jarvis	1881–85
John Branch	1817–20	Alfred M. Scales	1885–89
Jesse Franklin	1820–21	Daniel G. Fowle	1889–91
Gabriel Holmes	1821–24	Thomas M. Holt	1891–93
Hutchings G. Burton	1824–27	Elias Carr	1893–96
James Iredell	1827–28	D. L. Russell	1897–1901
John Owen	1828–30	C. B. Aycock	1901–05
Montford Stokes	1830–32	Robert B. Glenn	1905–

See NORTH CAROLINA, Vol. XVII, pp. 572–576.

NORTH CAROLINA, UNIVERSITY OF, located at Chapel Hill, in Orange County. The university was

"THE OLD WEST" UNIVERSITY OF NORTH CAROLINA.

founded in 1793, under a charter secured in 1789, its first endowment being Governor Benjamin Smith's gift of 20,000 acres of land in Tennessee.

The campus consists of 50 acres; the buildings are nine in number. A fine tract of 500 acres of woodland adjoins the campus. The university has departments of arts, literature, philosophy, and law, and courses in agriculture, arts, etc. There is also a post-graduate course. In 1902 it had 45 professors and instructors and 546 students. It is nonsectarian, and provides special facilities for poor but deserving students; has a library of 35,000 volumes; the value of the grounds and buildings is about $250,000, and its productive funds amount to $127,000. Its total income in 1902 was $72,500, $20,000 from the state.

NORTHCOTE, Sir Stafford. See Iddesleigh, Lord, in these Supplements.

NORTH DAKOTA, one of the north central group of states, and the thirty-ninth to be admitted

STATE SEAL OF NORTH DAKOTA.

to the Union. The first settlement made within the territory of Dakota, which now constitutes the states of North and South Dakota, was in 1780, by a French trader, who located at Pembina. The United States government expedition under Lewis and Clarke passed through the country, in 1804 going to and in 1806 returning from the Columbia River. A Scottish colony under a grant from the Hudson Bay Company settled at Pembina in 1812, remaining in possession until Aug. 8, 1823, when Maj. S. H. Long, in charge of a United States expedition, reached that point and raised the flag over the settlement. The first attempt at navigation of the waters of Dakota was in 1832, when the *Yellowstone*, a side-wheel steamboat, ascended the Missouri River to Fort Union, near the mouth of the Yellowstone River, in the interests of the American Fur Company of Pittsburg, which also sent the *Assiniboine* up the same river, but it was burned on its return trip with a cargo of furs, near the mouth of Heart River. Nebraska territory was organized May 30, 1854, and May 11, 1858, Minnesota became a state, leaving the country which now comprises North and South Dakota and Wyoming without legal organization. On March 2, 1861, the territory of Dakota was organized, and the year following its capital was located at Yankton. At this time Indian troubles were frequent, the Sioux being almost constant aggressors. In September, 1862, they made two unsuccessful assaults on Fort Abercrombie. In 1868 almost 90,000 square miles was taken from the territory of Dakota to form Wyoming territory. The Northern Pacific railroad broke ground for its line at Grand Forks, Jan. 2, 1872, which event began an era of rapid development, the settlement at Bismarck, the present capital of North Dakota, having been made in that year. A detachment of government troops under General Custer headed a scientific expedition to the Black Hills in 1874, from which the first authentic reports of that part of the country were obtained. In 1883 the seat of government was removed to Bismarck, and September 4th of the same year a convention met at Sioux Falls and framed a state constitution for Dakota, with the 46th parallel (the present southern boundary of North Dakota) as the northern boundary of the proposed new state. Eight days later a convention of citizens of the northern part of the territory assembled at Fargo to protest against this constitution. In 1884 and 1885 many new territorial institutions were opened, among the number being the North Dakota University, at Grand Forks, in the former year, and the Jamestown Insane Hospital, April 30th, in the latter year. On a vote as to the separation of South Dakota, in November, 1887, a majority was recorded in favor of the measure, North Dakota voting against it and South Dakota favoring it. The opposing factions gradually came together, and a convention held at Watertown, Dec. 5, 1888, reported in favor of the division of the territory, the northern portion to form the state of North Dakota and the southern portion the state of South Dakota. Having passed both houses of the Congress, the bill providing for the admission of the two new states was signed by President Cleveland, Feb. 22, 1889. The act relating to North Dakota provided for the assembling of a convention at Bismarck, July 4th, to prepare a constitution for submission to the people at an election to be held on the first Tuesday of the following October; and also for a division of the institutions, debts, records, etc., of the territory between the two proposed states. Upon receiving notice of the adoption of the constitution, the President was to issue his proclamation, admitting the state to the Union. The bill provided for the following grants of public domain:

	Acres.
For university purposes	46,080
For public buildings at the capital	32,000
For public buildings at the capital (additional)	50,000
For agricultural colleges	130,000
For a school of mines	40,000
For a reform school	40,000
For a deaf and dumb asylum	40,000
For the university	40,000
For normal schools	80,000
For general educational and charitable purposes	170,000

The state also became entitled to the customary land grant for public schools. Thirty thousand dollars was granted to erect a state penitentiary, the territorial prison having been set off to South Dakota. The state was to form one United States judicial district and be entitled to one representative in Congress, until otherwise provided.

The constitution framed at the Bismarck convention of 1889 provided for a senate and house of representatives, the former to consist of not less than 30 nor more than 50 members, to hold office for the term of four years; and the latter to consist of not less than 60 nor more than 140 members, their term of service to be two years. The sessions of the legislature are biennial, and after the first must not exceed 60 days; the passage of local and special

laws was forbidden, and all acts, except in the event of an emergency, were to take effect on July 1st, next after the close of the session at which passed.

The governor holds office for two years, or until his successor becomes duly qualified. He has the power to veto any separate item of an appropriation bill. The lieutenant-governor presides over the senate, not voting except in a case of equal division of the senators. In the event of the disability of the governor, he acts as such, the next in line of succession being the secretary of state.

The government also comprises a secretary of state, auditor, treasurer, superintendent of public instruction, commissioner of insurance, three commissioners of railroads, an attorney-general, and a commissioner of agriculture and labor—each to hold office for two years. The treasurer is not to hold office for more than two consecutive terms.

The supreme court has appellate jurisdiction only; consists of three judges elected by the people at large, to hold office for six years. When the population of the state exceeds 600,000, the number of judges may be increased to five. The people also elect district and county judges and justices of the peace.

All elections are conducted with secret ballots. Women are declared eligible to any school office, and are given the right to vote for school officers.

Other provisions are as follows:

The public schools are open to all children of the state, and free from sectarian control; the funds arising from the sale or lease of lands granted for educational or charitable purposes by the United States must never be diminished; the total annual tax for state purposes is limited to four mills on the dollar; railroads are taxed on their gross earnings; no state debt can be incurred in excess of $200,000 over and above the amount of indebtedness at the time of the adoption of the constitution; county and municipal indebtedness is also limited; the labor of children under 12 years of age is prohibited in mines, factories and workshops; the "black-listing" of employees is a misdemeanor; flowing streams and natural water-courses are to remain forever the property of the state for mining, irrigating and manufacturing purposes. Amendments to the constitution must be passed by a majority vote in two succeeding legislatures and be approved by a majority of the electors at a general election.

At the election, October 1st, the constitution was ratified by a heavy vote; the proposed article prohibiting the manufacture and sale of intoxicating liquors received a majority of 1,159 votes. On November 3d the proclamation admitting North Dakota to the Union was promulgated.

Up to 1895 North Dakota had many severe financial situations to battle with. The collection of taxes levied was difficult on account of the monetary depression, felt most severely among the farmers, the largest class of tax-payers. The unpaid taxes up to 1895 were as follows:

1889 and prior years	$117,893.93	1892	$ 25,816.86
1890	26,053.69	1893	52,090.61
1891	22,570.36	1894	320,353.85

Making a total of $564,779.30.

North Dakota lies between lat. 46° and 49° N. and long. 96° 25′ and 104° 5′ W. of Greenwich. It is bounded on the north by the Canadian provinces of Assiniboia and Manitoba; on the east by Minnesota; on the south by South Dakota, and on the west by Montana. The winters are cold, but the dryness of the atmosphere renders the low temperature endurable. At Bismarck the mean annual temperature is 39.4; at Fargo, 37; at Pembina, 34. The mean annual rainfall varies in different localities, that of Bismarck being 20.10 inches; Fargo, 27.17; Pembina, 21.91; and Fort Buford, 13.91.

The population of North Dakota in 1900 was 319,146. In 1880 the population of that part of Dakota territory which now constitutes North Dakota was 36,909, the gain during the decade constituting an increase of 395.05 per cent. The gross area of North Dakota is 70,795 square miles, of which 600 square miles is water surface. The density of population in 1900 was 4.5 to the square mile. The percentage of native-born population was 64.6, that of foreign-born was 35.4. The relative proportion of females to males is 79,808 to each 100,000. The number of negroes in North Dakota in 1900 was 286, the number in South Dakota being 465; a total in the two states of 751. The number of Chinese was given at 32, the number of Japanese at 148 and the number of civilized Indians at 2,276.

Essentially an agricultural region, North Dakota early came into prominence as a highly productive portion of the United States. The following facts are taken from the census reports of 1900:

Total acreage devoted to the cereals	5,610,349
Production of the cereals in bushels	89,939,074
Percentage of the whole area under corn	0.37
Percentage of the whole area under wheat	83.74
Percentage of the whole area under oats	12.45
Percentage of the whole area under barley	3.38
Percentage of the whole area under rye	0.05
Percentage of the whole area under buckwheat,	0.01
Total number of acres under corn	62,373
Total number of bushels of corn produced	1,284,870
Total number of acres under wheat	4,451,251
Total number of bushels of wheat produced	59,888,817
Total number of acres under oats	780,517
Total number of bushels of oats produced	22,125,331
Total number of acres under barley	287,092
Total number of bushels of barley produced	6,752,060
Total number of acres under rye	27,995
Total number of bushels of rye produced	368,240

Considering North and South Dakota together, the acreage of meadow-land to be mown for hay was increased from 1879 to 1889 more than tenfold, or 1,924,813 acres were added; the number of horses on farms was increased by 339,566, the per cent of increase being 814.89, the greatest in the country; the number of swine was increased from 63,394 in 1880 to 682,678 in 1890; the number of sheep was increased by 289,687, and the clip of wool 1,427,301 pounds; the number of working oxen was greater by 49,938; the number of milch cows was more than seven times greater in 1890 than in 1880, the increase being 257,957, and notwithstanding the total number of cattle of all kinds averaged less than ten to the square mile, the annual production of milk in both North and South Dakota amounted to more than 100 gallons per capita of

population. Both of the Dakotas were included in the states reporting an increase in the product of butter on farms, and were noted as being among the very few states not experiencing a large decrease in the amount of cheese made on farms. In the twelfth census the state of North Dakota stood

CAPITOL BUILDING, BISMARCK, NORTH DAKOTA.

seventh in area devoted to flax, seventh in the production of seed, and eighth in the total value of all flax products. The acreage in 1899 was 773,999, and the amount produced 7,766,610 bushels. In 1890, 3,163,742 bushels of Irish potatoes were raised; in 1900 the yield was 2,257,350 bushels, a decrease of 906,392 bushels.

In the census returns of 1900 the two states of North and South Dakota are compared with the territory of Dakota, in tables of agricultural statistics. It therefore becomes necessary to give the combined returns from both states, in order to make intelligent comparisons between 1890 and 1900:

Total number of farms in Dakota territory in 1880	17,435
Total number of farms in North Dakota in 1900	45,332
Total number of farms in South Dakota in 1900	52,622
Total number of farms in North and South Dakota in 1900	97,954
Increase in the number of farms, 1890 to 1900	20,185
Total acreage in farms in Dakota territory in 1880	3,800,656
Total acreage in farms in North Dakota in 1900	15,542,640
Total acreage in farms in South Dakota in 1900	19,070,616
Total acreage in farms in North and South Dakota in 1900	34,613,256
Increase in the acreage in farms, 1890 to 1900	15,556,463
Acres of improved land in farms in Dakota territory, 1880	1,150,413
Acres of improved land in farms in North Dakota in 1900	9,644,520
Acres of improved land in farms in South Dakota in 1900	11,285,983
Acres of improved land in farms in North and South Dakota in 1900	20,930,503
Increase in acres of improved land in farms, 1890 to 1900	9,313,195
Value of land, fences and buildings, Dakota territory, 1880	$ 22,401,084
Value of land, fences and buildings, North Dakota, 1900	$198,780,700
Value of land, fences and buildings, South Dakota, 1900	$220,133,190
Value of land, fences and buildings in North and South Dakota, 1900	$418,913,890
Increase in value of land, fences and buildings, 1890 to 1900	$236,137,250
Value of farm-implements and machinery, Dakota territory, 1880	$ 2,390,091
Value of farm-implements and machinery, North Dakota, 1900	$ 14,055,560
Value of farm-implements and machinery, South Dakota, 1900	$ 12,218,680
Value of farm-implements and machinery, North and South Dakota, 1900	$ 26,274,240
Increase in value of farm-implements and machinery, 1890 to 1900	$ 11,254,348
Value of live-stock, Dakota territory, June 1, 1880	$ 6,463,274
Value of live-stock, North Dakota, June 1, 1900	$ 42,430,491
Value of live-stock, South Dakota, June 1, 1900	$ 65,173,432
Value of live-stock, North and South Dakota, June 1, 1900	$107,512,910
Increase in value of live-stock, 1890 to 1900	$ 59,494,107
Increase in value of three above items	$306,885,705

The 45,332 farms of North Dakota were divided according to size as follows: 407 were under 10 acres; 384 were over 10 and under 20 acres; 555 were over 20 and under 50 acres; 716 were over 50 and under 100 acres; 36,810 were over 100 and under 500 acres; 5,114 were over 500 and under 1,000 acres, and 1,346 were over 1,000 acres, the average size being 342.9 acres. Of the whole number of farms, 33,866 were cultivated by the owners, 591 were rented for a fixed money value, and 3,274 were rented for a share of the products.

In 1894 the state commissioner of agriculture reported as follows: The tendency of the farmers of the state is toward diversification of crops. The acreage of wheat, once considered the great staple of the two Dakotas, has increased since the census year but 16 per cent, while the acreage of oats, barley, flax, rye, corn and potatoes, considered as a whole, has increased about 47 per cent. During the four years oats increased about 24 per cent, barley 150 per cent, rye more than 500 per cent, potatoes about 23 per cent. Flax and corn have been less steady, increasing one year to decrease the next. In 1890 the greatest flax acreage in the history of the state was recorded, 114,000 acres. This dropped to about one-fourth that acreage in 1892, but since has recovered, the crop of 1899 rising to the high yield of over 7,766,000 bushels. The following report was gathered by the county assessors in 1899:

Crop.	1899.	
	Acres Sown.	Amount harvested (Bushels).
Wheat	4,451,251	59,888,817
Oats	780,517	22,125,331
Barley	287,082	6,752,060
Flax Seed	773,999	7,766,610
Rye	27,995	368,240
Corn	62,373	1,284,870
Potatoes	21,936	2,257,350
Hay and forage	1,410,534	1,748,213 (tons)

The number of sheep sheared in 1899 was 451,437, the clip 3,030,478 pounds. In 1900 the number of farms in the state had increased to 45,332, the number of acres under cultivation was 9,644,520 and the total acreage of farms 15,542,640. The total number of acres in crops, including tame grasses, amounted to 13,726,973, and in cultivated timber of more than one year's growth there were 36,792 acres.

In 1900 North Dakota had 1,130 specified manufacturing industries, in which the capital employed amounted to $5,396,490; the number of persons engaged numbered 2,398, whose annual wages amounted to $1,222,472, and the finished products aggregated $9,183,114. Flouring and grist-mill products led in importance, the amount of the output being $4,134,023. Other industries of importance were printing and publishing, saddlery and harness, foundry and machine-shop products, and tobacco and cigars.

For the fiscal year ending June 30, 1900, the superintendent of public instruction of North Dakota reported 1,179 organized districts of all kinds, 88 graded schools, 1,878 ungraded schools; total seating-capacity of all schoolhouses, 94,445; total value of school property, $1,910,638; enumeration for apportionment in 1899 showed 93,567 pupils; average monthly wages of male teachers $44.75, of female teachers $35.03. At the time of this report there were 9,501 trees growing on school-grounds, mainly planted by the pupils on Arbor day. State normal schools are maintained at Mayville, on an appropriation in 1893, for the two years following, of $30,000; and at Valley City, on an appropriation for the two years, 1893 and 1894, amounting to $14,000. A normal department is maintained in the University of North Dakota. The North Dakota Agricultural College is also under state control, and receives aid both from the state and the Federal government.

North Dakota in 1898 had 868 church organizations, 335 edifices, a membership of 59,496, which was 32.56 per cent of the entire population, and church property of the value of $780,775. The number of denominations was 22, the principal ones being the Baptists, with 54 organizations; the Roman Catholics, with 115; the Congregationalists, with 65; the Lutherans, with 298; the Methodists, with 140; the Presbyterians, with 100; and the Protestant Episcopal, 39.

For 1899 the state treasurer reported the receipts from county taxes, $334,165; from railroads, $97,223; from insurance, $18,760; from sale of warrants, $210,000; receipts from all sources, including a balance of $61,568 carried over from 1894, were $1,160,225. The total amount of expenditures was $1,103,676, leaving a balance of $56,549 at the opening of 1900. The appraisement for the purposes of assessing the taxes for 1900 resulted in values being equalized as follows: Real property $77,739,637, personal property $27,849,290, etc., a total of $117,204,485. The state indebtedness in 1899 amounted to $800,000, the maximum indebtedness allowed by the constitution.

The railway mileage in North Dakota at the close of 1900, according to the assessment made in each county of the state, was 2,826.72. Three of the five lines of road operating partly within the state reported deficits after comparing the gross receipts with the operating expenses.

The state charitable, reformatory and penal institutions include the School for the Deaf at Devil's Lake, the State Hospital for the Insane at Jamestown, Soldiers' Home at Lisbon, and the State Penitentiary at Bismarck. An institution for the blind was in course of erection at Bathgate, in Pembina County, in 1896.

In 1894 an irrigation plant was established at Bottineau, and the results proved favorable. In addition to the numerous streams, many of them considerable rivers, North Dakota has admirable provisions for irrigation in artesian wells. In 1896 there were 672 flowing wells, besides hundreds from which water is obtained by pumping. Of the former, the most noted is the Minnehaha, at Turtle Mountains, which flows 283 gallons per minute.

Jan. 1, 1899, there were 155 newspapers published in North Dakota, of which 7 are daily, 1 semiweekly, 140 weekly, 1 semimonthly, and 6 monthly. Papers are published in 37 of the 39 counties, and in 95 of the cities, towns, and villages of the state, of which 37 are county seats.

The following is a list of the principal cities and towns of North Dakota, with their populations, as given in the census reports of 1900: Bismarck, 3,319; Dickinson City, 2,076; Fargo City, 9,589; Grafton, 2,378; Grand Forks, 7,652; Jamestown, 2,853; Valley City, 2,446; Wahpeton, 2,228.

State flower, Wild Rose and Golden Rod.

Governors of North Dakota from the admission of the state in 1889, with their respective terms of office:

John Muller	1889–91	F. E. Briggs	1897–99
A. H. Burke	1891–93	F. B. Fancher	1899–1901
E. Shortridge	1893–95	Frank White	1901–05
R. Allin	1895–97	E. Y. Searles	1905–

See DAKOTA, Vol. VI, pp. 681, 682.

NORTHFIELD, a town of Franklin County, Massachusetts, in the northwestern part of the state. It was the birthplace of Dwight L. Moody, the evangelist (q. v.), and is the site of the Northfield Seminary for young women and the Mount Hermon School for young men, founded by him and now developed into great religious institutions. It is reached by the Connecticut River and the Central Vermont railroads, and had in 1900 a population of 1,966. W.F.J.

NORTHFIELD, a city of Rice County, southeastern Minnesota, 34 miles S. of St. Paul and 32 miles W.S.W. of Red Wing, on the Minneapolis and St. Louis and the Chicago, Milwaukee and St. Paul railroads; has a foundry and machine-shop, saw and planing mills; is surrounded by a farming country. It contains Carleton College (Congregational), a co-educational institution founded in 1870, having in 1901, 21 instructors, 366 students, and a library containing 15,400 volumes. Also St. Olaf College (Lutheran), a co-educational institution, organized in 1874 and having in 1901, 17 instructors, 306 pupils, and a library containing 3,400 volumes. Population 1890, 2,659; 1900, 3,210.

NORTHFIELD, a town of Washington Coun-

ty, central Vermont, 9 miles S.S.W. of Montpelier, on the Central Vermont railroad; noted for its slate quarries. It has flannel, excelsior and granite works and a corn cannery. Northfield is the seat of a military school, known as Norwich University, established in 1834. Population 1900, 1,508.

NORTH MAGNETIC POLE. See METEOROLOGY, Vol. XVI, p. 168; also MAGNETISM, Vol. XV, p. 222.

NORTH PLATTE, a city and the capital of Lincoln County, central southwestern Nebraska, 50 miles E. of Ogallala, on the Union Pacific railroad and at the north and south forks of the Platte River. It has extensive railroad repair-shops, employing a great number of men, and a large flour-mill, and is surrounded by an extensive cattle-raising and agricultural district. Population 1900, 3,640.

NORTHROP, CYRUS, an American educator; born in Ridgefield, Conn., Sept. 30, 1834. He graduated at Yale Academical Department in 1857, and from the Law School in 1859, and was admitted to the Connecticut bar in 1860. He was clerk of the Connecticut House of Representatives in 1861, and of the State Senate in 1862. He became editor of the New Haven *Palladium* in 1863, and was professor of rhetoric and English literature at Yale from 1863 to 1884. In the latter year he was chosen president of the University of Minnesota, and has held the position since that time. E.E.T.

NORTH SEA AND BALTIC CANAL. See CANALS, in these Supplements.

NORTHUMBERLAND, a borough of Northumberland County, Pennsylvania, in the east-central part of the state. It stands at the great fork of the Susquehanna River, and in the anthracite coal and lumber country. It is reached by the Pennsylvania, the Philadelphia and Reading, the Delaware, Lackawanna and Western and the Northern Central railroads, and had in 1900 a population of 2,748. W.F.J.

NORTHUMBERLAND, ALGERNON GEORGE PERCY, DUKE OF, an English nobleman; born in 1810, and educated at Eton and St. John's College, Cambridge, of which university he was made a doctor of laws in 1842. He first entered Parliament as member for the borough of Beeralston, and represented the northern division of Northumberland in the Conservative interest from 1852 down to 1865. He held office in 1858–59, first as a lord of the admiralty and afterward as vice-president of the Board of Trade. He succeeded to the dukedom in 1867, was appointed Lord Privy Seal in 1878, and in the same year made chairman of the Royal Commission charged with conducting an inquiry into the parochial charities of the city of London. He was president of the Royal Institution, honorary colonel of the Northumberland militia, and lord-lieutenant of Northumberland. Died Jan. 2, 1899.—His eldest son, EARL PERCY (born in 1846), was long Conservative member for North Northumberland, and was called to the House of Lords in his father's barony of Lovaine in 1887.

NORTHUMBRIA. See NORTHUMBERLAND, KINGDOM OF, Vol. XVII, p. 582.

NORTH VERNON, a village of Jennings County, southeastern Indiana, 2 miles N.W. of Vernon, on the Baltimore and Ohio, the Cincinnati, Columbus, Chicago and St. Louis and the Pittsburg, Cincinnati, Chicago and St. Louis railroads; has graded schools; several breweries are here, and it manufactures chairs, flour, furniture and woolen goods. Population 1890, 2,012; 1900, 2,823.

NORTHWESTERN ALLIANCE. See FARMERS' ORGANIZATIONS, in these Supplements.

NORTHWESTERN UNIVERSITY, an institution of learning, for both sexes, maintained at Evanston, Illinois, a suburb of Chicago, by the

LIBRARY, NORTHWESTERN UNIVERSITY.

Methodist Episcopal Church, having been founded in 1851. It is provided in the charter that the institution "shall remain located in or near the city of Chicago." The location of the campus, comprising 45 acres of oak-grove, along the front of Lake Michigan, could scarcely have been better chosen. The schools are divided between Chicago and Evanston. Those at Evanston are the College of Liberal Arts, the Garrett Biblical Institute and the School of Music. The College of Liberal Arts has four courses: classics, philosophy, modern literature, and science. The Garrett Biblical Institute, comprehending Heck Hall and Memorial Hall, though under a separate corporation, serves as the theological department, and includes a Norwegian-Danish and a Swedish theological seminary. The schools of law, medicine, pharmacy, and dentistry, as well as the women's medical school, are located at Chicago. In 1905 there were 302 professors and instructors, and 4,007 students. The total number of graduates up to 1905 was 9,819. The university maintains high standards in all its departments. The medical school was the first in the United States to insist on preliminary entrance examinations; and was one of the first to establish a four years' course. Its law school has a three years' course, and grants the degree of LL.B. The Dearborn Observatory belongs to the university, and its telescope, the largest when made, has an 18½ inch aperture. The library in 1905 contained 94,595 volumes, and is particularly rich in the classics. The income of the university in 1904 was $780,344, and the productive funds were $5,595,343, much of the property being in Chicago. Dr. Edmund J. James, dean of the Univ. of Chicago, succeeded H. W. Rogers, LL.D., as president in 1892. *Revised by* R, W.C.

NORTH-WEST TERRITORIES. The North-West Territories of Canada include the vast region, of 1,293,295 square miles in extent, lying west of Manitoba and the District of Keewatin, formerly owned by the Hudson Bay Company. Out of this

great tract a group of four districts was organized, in 1882, by the Dominion government, with a total area of 555,640 square miles, of which 19,545 square miles are water. The following are the districts, with their separate areas in square miles: Assiniboia (90,340); Saskatchewan (114,000); Alberta (100,000), and Athabasca (251,300). The Canadian Pacific railroad traverses both Assiniboia and Alberta, onward, across the Rocky Mountains to the Pacific Coast. Both districts are bounded on the south by the international boundary line. Assiniboia is flanked by Manitoba on the east and by Alberta, or long. 111° W., on the west. Its northern limit is the southern boundary of Saskatchewan (lat. 52° N.), which has the same western boundary as Assiniboia, and a northern boundary near lat. 55° N. The eastern limit of Saskatchewan is Manitoba and Lake Winnipeg. The western boundary of Alberta is the Rocky Mountains, and its northern is also the line, lat. 55° N. To the north of Alberta is the district of Athabasca, which is bounded on the south by lat. 55° N. and on the north by lat. 60° N.; its eastern boundary is long. 111° 50′ W. and its western long. 120° W. The population of the organized territories was, by the census of 1901, 158,940, of which about 15,000 were Indians, or 20,000 including the nomadic tribes that people the northern watercourses flowing into the Arctic Ocean. The Indians of this region include the half-breeds located along the two branches of the Saskatchewan river, who in 1885 took part in the Riel rebellion against the Dominion government. The capital of the North-West Territories is Regina (pop. 2,645), in Assiniboia, 357 miles W. of Winnipeg. It is the seat of the local government and the headquarters of the North-West Mounted Police, a force 1,000 strong, maintained by the Dominion authorities for the preservation of law and order. Since 1888 the affairs of the North-West Territories have been administered by a lieutenant-governor, an advisory council or executive of three members, and a legislative assembly of 31 members. In 1894, by act of the Federal Parliament, the local assembly, which represents the four organized districts, was given full control of the finances of the Territories, the number of its local representatives, the boundaries of the constituencies; it also increased the period of existence of the assembly to four years. Representation was also given the Territories, in the Dominion Parliament, by two members in the Senate and four in the House of Commons.

There is no public debt, the government of the Territories not having power to borrow money or pledge the public credit. The federal vote for 1895–96 amounted to $242,879, $115,000 of which was appropriated for the purposes of education and $65,000 for roads, bridges and public works. The first school district in the Territories was organized in 1884. In 1900 there were 492 public schools, 2 Protestant separate schools, 44 Roman Catholic public schools and 11 Roman Catholic separate schools. The average pupil attendance, 9,439. Denominationally, the population is roughly classified as one half Protestant, 15 per cent Roman Catholic and 35 per cent pagan (Indian). The chief towns besides the capital are Edmonton, Prince Albert and Battleford, on the north branch of the Saskatchewan, and Moosomin, Moose Jaw, Medicine Hat and Calgary, on the line of the Canadian Pacific railroad, and Lethbridge, on the Belly River, near Fort McLeod. Lethbridge has of recent years become a center of the rich coal country in the southern portion of the district of Alberta. The coal is bituminous, and in the locality has been estimated to cover an area of 15,000 square miles. Though not of the best quality, for the farmer and colonizer it is an important "find" in a vast treeless region. Near Banff and close to the line of the Canadian Pacific railway a mine of anthracite coal is being developed. This deposit represents the only true anthracite coal which is being worked in America, outside of Pennsylvania. It is said to contain a larger amount of fixed carbon and give greater heat than the Pennsylvania coal, and also to burn more rapidly. Extensive coal-measures have also been tapped along the valleys of the Peace and Bow rivers and the North Saskatchewan. The output of the commodity in the Lethbridge region aggregated, in 1894, 250,000 tons.

It is, however, as a great grain-producing and cattle-ranching area that the North-West Territories are most noted. So rich and extraordinarily fertile is the soil that it needs no laborious tilling, and there are no tree-stumps or rocks to interfere with the operations of the sulky plow or detract from the joy of the harvesting. The one drawback is the distant market and the high freights which have to be disbursed to reach it. Against this chief drawback, the scarcity of labor and perhaps the lack of adequate machinery for farming operations on a large scale, and the taxes on it which a high tariff imposes, are wholly subordinate. The chief grazing-region lies in the district of Alberta, on the slopes of the Rocky Mountains, where cattle and horses range winter and summer without shelter. The census of 1891 gives the following as the live-stock of the Territories: Horses, 42,956; horned cattle, 233,721; sheep, 64,920; and swine, 16,293. To the north of the Territories stretch the vast solitudes utilized by the Hudson Bay Company as "the last great fur preserve of the world," and organized in 1895 into the districts of Mackenzie and Franklin, and the territory of Yukon. (Pop. 1901), 52,709.

NORTH WILMINGTON, a borough of Lawrence Co., Pa., near Volant; is the site of Westminster College, a co-educational institution, organized in 1854, having, in 1898, 11 instructors, 291 pupils, and a library of 4,000 vols. Pop. 1900, 791.

NORTHWOOD, a village, the capital of Worth Co., Iowa, 23 miles N. W. of Osage, on the Burlington, Cedar Rapids and Northern railroad; has a newspaper office, graded schools, and a flour-mill; is in a farming district. Pop. 1890, 859; 1900, 1,271.

NORTH YAKIMA, a city and the capital of Yakima County, central southern Washington, 30 miles S. of Ellensburg, on the Northern Pacific railroad, and at the confluence of the Yakima and Natchess rivers; is in a rich agricultural district, and has good water-power from the Yakima River, for its mills. Grain, fruit, tobacco, sorghum, hops, and

alfalfa are grown; dairy products and live-stock are shipped. Population 1900, 3,154.

NORTON, ANDREWS, theologian, was born at Hingham, Mass., on December 31, 1786, and was graduated from Harvard College in 1804. In 1809 he was a tutor at Bowdoin, in 1811 a tutor at Harvard, in 1812 editor of the *General Repository*, a theological journal, in 1813 a lecturer on Biblical criticism at Harvard, and from 1819 to 1830 professor of sacred literature. He was the author of *The Latest Form of Infidelity*, *Evidences of the Genuineness of the Gospels*, *Tracts Concerning Christianity*, *A Translation of the Gospels*, and other works, wrote much for periodical literature, and did much editorial work on books and journals. He was one of the ablest Unitarian theologians of his time. He died at Newport, R. I., on Sept. 18, 1852. W.F.J.

NORTON, CHARLES ELIOT, an American *littérateur* and art critic; born in Cambridge, Mass., Nov. 16, 1827. He graduated at Harvard in 1846 and entered commercial life in Boston, in the course of which he made a voyage to the East Indies as supercargo in 1849, returning through Europe, to which later, having devoted himself to literary pursuits, he made several trips. From 1862 to 1868 he was associate editor, with Lowell, of the *North American Review*. In 1874 he was chosen professor of the history of art at Harvard University, a position he held until 1898, when he retired with the title of professor emeritus. He is widely known as a student, translator, and exponent of Dante's works, and an acknowledged critic in the realms of art. He was the founder, in 1879, of the Archæological Institute of America, and for many years its president and most active member. Among his works are *Historical Studies of Church Building in the Middle Ages* and *Notes of Travel and Study in Italy*. He has edited some of the correspondence, works, etc., of many men of letters, including J. R. Lowell, G. W. Curtis, Thomas Carlyle, R. W. Emerson, John Ruskin, etc. E.E.T.

NORTON, LILLIAN, an American opera singer, better known as Madame Nordica. See DOME, MRS. Z. F., in these Supplements.

NORTON, WILLIAM EDWARD, an American marine-painter; born in Boston, in 1843. He was a house-painter in his youth, and, while his fellow-workmen were anxious for all the easy, indoor work he was ready to do graining and similar work outdoors in the roughest weather, for the sake of the study. He came of a ship-building family, and took two or three sea-voyages to get sea effects, having determined to become a marine-painter even in those early days. This discipline and conscientious study, added to his natural gifts, made him a decided success in the world of marine-painters. After painting in Boston for several years, he went abroad in 1877, and opened a studio in London, where he continued to reside. Among his early works, which made his name in Boston, are *Gathering Help; Whaleships Trying Out;* and *Early Morning*. At the Philadelphia Centennial Exhibition of 1876 he exhibited *Fog on the Grand Banks;* and in recent Royal Academy exhibitions he had *The Thames Near Blackwell; Twilight on the Banks of Newfoundland;* and *Becalmed on the Grand Banks*. At the World's Columbian Exposition in Chicago he was represented by *Moonlight on the River; Return of the Herring Fleet, Holland; A Moment's Rest; Off the Dutch Coast;* and *Mid-Channel*.

NORUMBEGA, a name, whether of Indian, Norse or Spanish origin is uncertain, by which the early French explorers of America designated a region or city on the northeastern shore of New England, or possibly within the limits of what are now known as the British Provinces. According to B. F. De Costa, in his work on *Norumbega and the English Explorers*, a very similar name occurs in the map of Verrazano (1529). With various spellings the name also appears in maps and records of other authors of the period, the site of the lost city being variously located, on the Penobscot in Nova Scotia, Newfoundland, the country of the lower Hudson, and, lastly, by the late Professor Eben N. Horsford, along the lower reaches of Charles River, Massachusetts. See also LEIF ERICSON, in these Supplements; and AMERICA, Vol. I. pp. 619–620.

NORWALK, a township of Connecticut, for the geographical location of which see NORWALK, Vol. XVII, p. 588. It is on the New York, New Haven and Hartford R.R.; has two savings and three national banks; two public libraries and sixteen churches. Pop. of township 1900, 19,932; of city, 6,125; of South Norwalk city, 6,591.

NORWALK, a city and the capital of Huron County, northern Ohio; 16 miles southeast of Sandusky and 56 miles southwest of Cleveland. It is in a farming region where considerable attention is given to dairying. It has manufactories of agricultural implements, pianos, organs, sewing-machines, etc. Pop. 1890, 7,195; 1900, 7,074. See also NORWALK, Vol. XVII, p. 588.

NORWAY. (For general article on the kingdom of Norway see NORWAY, Vol. XVII, pp. 558–606.) Norway has an area of 124,445 square miles. The

COUNTIES.	AREA, ENGLISH SQ. MILES.	POPULATION, DEC. 30, 1900.
Kristiania (town)	6	227,626
Akershus	2,055	116,228
Smaalenene	1,600	136,886
Hedemarken	10,621	126,182
Kristians	9,793	116,280
Buskerud	5,790	112,676
Jarlsberg og Larvik	896	104,554
Bratsberg	5,865	99,052
Nedenes	3,609	79,935
Lister og Mandal	2,805	81,567
Stavanger	3,532	127,592
Söndre Bergenhus	6,026	135,752
Bergen (town)	5	72,251
Nordre Bergenhus	7,132	89,041
Romsdal	5,788	136,137
Söndre Trondhjem	7,184	135,382
Nordre Trondhjem	8,791	83,433
Nordland	14,517	152,144
Tromsö	10,134	74,362
Finmarken	18,296	32,800
Totals	124,445	2,239,880

latest official census (1900) placed the population at 2,239,880. The preceding table gives the population by provinces:

The population of the principal towns (1900) was:

Kristiania	227,626	Fredrikstad	14,635
Bergen	72,251	Larvik	10,668
Trondhjem (and suburbs)	38,180	Fredrikshald	11,957
Stavanger	30,613	Kristiansund	12,050
Drammen	23,093	Skien	11,394
Kristiansand	14,666	Aalesund	11,777

Central Executive Government. The year following the coronation of Charles XIII, a charter (the riksakt) was promulgated, establishing new fundamental laws on terms of perpetual union with Sweden, declaring such union indissoluble and irrevocable, yet without prejudice to the separate local government of each country. The law of succession to the throne is the same in both countries. In case of absolute vacancy of the throne, the two diets are to assemble for the election of the future sovereign, and should they not be able to agree upon one person, an equal number of Swedish and Norwegian deputies will meet at the city of Karlstadt, in Sweden, for the appointment of the king, this nomination to be absolute. The common affairs are decided upon in a council of state, composed of Swedes and Norwegians. In case of the minority of the king, the council of state is to exercise the sovereign power until a regent or council of regency is appointed by the united action of the Diets of Sweden and Norway.

The latest revision of the constitution of Norway was made in 1889. The legislative power of the realm continues to be vested in the "storthing," or Great Court, which is declared to be the "representative of the sovereign people." The king of Sweden and Norway, however, possesses the right to veto laws passed by the Storthing, but only for a limited period. The royal veto may be exercised twice; but if the same bill pass three storthings formed by separate and subsequent elections, it becomes the law of the land without the assent of the sovereign. The king has the command of the land and sea forces, and makes all appointments, but, except in few cases, is not allowed to nominate any but Norwegians to public offices.

The Storthing assembles every year. New elections take place every three years. The meetings take place *suo jure*, and not by any writ from the king or the executive. They begin in February each year, and must receive the sanction of the king to sit longer than two months. Every Norwegian citizen of twenty-five years of age can vote, who, in the year before election, has paid income tax on an annual income of at least five hundred kroner in the country districts, or eight hundred kroner in the towns (provided that he has resided one year in the electoral district at the time when the election takes place, and that he does not belong to the household of another as a servant), or who is or has been a public functionary, or possesses property in land, or has been tenant of such property for five years at least, or is a burgess of any town, or possesses real property in a town of the value of six hundred kroner.

Under the same conditions, citizens thirty years of age, and settled in Norway for at least ten years, are entitled to be elected. The mode of election is indirect. Toward the end of every third year the people choose their deputies, at the rate of one to fifty voters in towns, where the election is administered by the magistrate, and one to a hundred in rural subdistricts, where they meet in the parish church under the presidency of the parish minister. The deputies afterward assemble and elect among themselves, or from among the other qualified voters of the district, the Storthing representatives. No election takes place for vacancies, which are filled by the persons who receive the second largest number of votes. Of the total male population, 45 per cent are 25 years of age and above. The Storthing has 114 members—38 from towns, 76 from rural districts.

The Storthing, when assembled, divides itself into two houses, the "Lagthing" and the "Odelsthing." The former is composed of one fourth of the members of the Storthing, and the other of the remaining three fourths. Each house nominates its own presidents. If the Odelsthing and Lagthing do not agree, the two houses assemble in common sitting, to deliberate, and the final decision is given by a majority of two thirds of the voters. The same majority is required for alterations of the constitution. The Storthing can also form itself into a high court of justice for the impeachment and trial of ministers, members of the chief court of justice and members of the Storthing. While in session, every member of the Storthing has an allowance of 12 kroner a day, besides traveling expenses.

The executive is represented by the King, who exercises his authority through a Council of State, composed of two ministers of state and at least seven Councilors. Two of the councilors, who change every year, together with one of the ministers, form a delegation of the Council of State, residing at Stockholm, near the King. Ministers and Councilors of State are entitled to be present in the Storthing and to take part in the discussions when public, but without a vote.

There are eight council ministers at Kristiania, Norway, and a delegation of three located near the King, at Stockholm, Sweden.

The reigning monarch is King Oscar II, the fourth sovereign of the house of Ponte Corvo, and grandson of Marshal Bernadotte, Prince de Ponte Corvo. The latter was elected heir-apparent of Sweden by the Parliament of the kingdom, Aug. 21, 1810, and ascended the throne Feb. 5, 1818, under the name of Carl XIV Johan. He was succeeded at his death, March 8, 1844, by his only son, Oscar I. The latter died July 8, 1859, and was succeeded by his eldest son, Carl XV, at whose premature death (Sept. 18, 1872) without male children, his next surviving brother, the present king, succeeded.

The royal family of Sweden and Norway has a civil list of $331,665 from Sweden, and $120,430 from Norway. The sovereign, besides, has an annuity of $83,330, voted to King Carl XIV and his successors on the throne of Sweden.

Finance and Defense. The revenue and expenditure for the year 1899 were, respectively, $24,-

642,690 and $22,183,500, the amounts varying but little each year.

The army, on Jan. 1, 1900, numbered 30,000 men, with 900 officers. The number of troops of the line actually under arms can never exceed 18,000 men, even in war, without permission of the Storthing. The King has permission to transfer, annually, 3,000 men from Norway to Sweden, and *vice versa*, for "common military exercises" only.

The naval force of Norway consists of 2 modern armorclads, 4 ironclad monitors, an armored gunboat, 1 wooden corvette, 32 gunboats, besides a small torpedo flotilla. Excluding the smaller class of gunboats, which have little value, Norway's effective fleet is about 31 in all. All the seafaring men in the seaports between the ages of 22 and 35 are enrolled in either the active fleet or naval militia. They numbered, in 1899, nearly 25,000 men.

NORWEGIAN LANGUAGE. See SCANDINAVIAN LANGUAGES. Vol. XXI, p. 385.

NORWICH, a city of New London County, southeastern Connecticut, on the Central Vermont and the New York and New England railroads. It has two public libraries, a hospital and art museum. The population of the town was, in 1900, 24,637; of the city, 17,251. See also NORWICH, Vol. XVII, p. 610.

NORWICH, a village and the county seat of Chenango County, New York, in the south-central part of the state. It is on the Chenango River, in an agricultural, dairying and hop-growing region, and contains car shops, creameries, breweries and wood-working factories. It is reached by the Delaware, Lackawanna and Western and the New York, Susquehanna and Western railroads, and had in 1900 a population of 5,766. W.F.J.

NOSE, DEVELOPMENT OF. See SENSE-ORGANS, in these Supplements.

NOSOLOGY. See CULLEN, WILLIAM, Vol. VI, p. 614.

NOSTOC, a genus of the *Schizophytes*, or fission-algæ, found in water and damp places, and often occurring in cavities of higher plants. The plant body is a chain-like filament of cells, in which occur certain larger cells known as *heterocysts*. The cell-walls secrete such abundant mucilage that numerous cell-chains become imbedded together in structureless masses of jelly, which may attain the size of a plum or larger, and are found floating in the water or attached to other bodies.

NOTACANTHIDÆ, a family of elongated fishes, living in the cold, deep oceans. They have nothing of popular interest connected with them.

NOTATION, algebraic. See ARITHMETIC, Vol. II, pp. 460–463. For astronomical notation, see COMET, Vol. VI, pp. 163–173. For chemical notation, see CHEMISTRY, Vol. V, pp. 87–89. For musical notation, see MUSIC, Vol. XVII, p. 87.

NOTHINGARIANS OR GORTONIANS. See GORTON, SAMUEL, in these Supplements.

NOTIDANIDÆ, a family of sharks, characterized by having more gill-clefts than ordinary sharks. The representatives are inhabitants of the warmer seas. *Notidanus*, the type-form, is the cow-shark of warm, temperate waters. See SHARKS, Vol. XXI, p. 815.

NOTOCHORD. See SKELETON, Vol. XXII, pp. 117–118.

NOTOPTERIDÆ, a family of fresh-water fishes. See ICHTHYOLOGY, Vol. XII, pp. 711–733.

NOTORNIS, a bird of the family of rails, which formerly inhabited New Zealand. See MOOR-HEN, Vol. XVI, p. 835; and BIRDS, Vol. III, p. 634, note.

NOTRE DAME, UNIVERSITY OF, a Roman Catholic institution located at South Bend, Indiana; founded in 1844 by the Rev. Edward Sorin, and conducted by the members of the Congregation of the Holy Cross. It is the largest, and possibly the most important, of the Roman Catholic universities in the United States. It has a roll of 42 professors and instructors, and usually about 600 students. The library has about 50,000 volumes; the value of the scientific apparatus is $35,000, and of the property $800,000. The institution is conducted independently of all endowment, the sole revenues being derived from the fees, the annual charge to each student being $300. The courses embrace the classics, mathematics, science, law and fine arts. Phonography, telegraphy and typewriting are also under the care of competent instructors. The scientific side provides special advantages for the study of natural and physical sciences, mechanical engineering and applied electricity.

NOTT, ELIPHALET, an American educator; born in Ashford, Conn., June 25, 1773. He was largely self-taught, and he received no collegiate education; but he studied divinity, and at the age of 21 was sent on mission work in central New York. In passing through Cherry Valley Otsego County, N. Y., he accepted a call to take charge of the Presbyterian church at the place, and, in addition to the pastorate, conducted the academy. Two or three years afterward he was called to the Presbyterian church at Albany, N. Y., and in 1804 he was chosen president of Union College, Schenectady, N. Y., which position he held till his death. He was instrumental in building up the college from a condition of poverty to a comfortable foundation. He was an earnest advocate of temperance. He took out over 30 patents on heating-devices, and invented a stove which was long in use. He died in Schenectady, Jan. 29, 1866.

ELIPHALET NOTT.

E.E.T.

NOTTINGHAM, the chief town of Nottinghamshire, England, has been considerably enlarged in its municipal boundaries since the writing of the account in Vol. XVII, pp. 612–615. By an act of Parliament passed in 1877, the boundaries of the town were extended, and now include Lenton, Radford, Basford, Sneinton, Bulwell, the Park, Carrington, Sherwood, Brewhouse Yard and parts of Wilford and Gedling. The population of the county borough, co-extensive with Parliamentary borough

is 239,753. The area of the borough is 10,935 acres. Besides a town and county hall, an exchange, St. Mary's, and several other churches and places of worship, Nottingham has a grammar school, a free library, a natural history museum, university buildings (built at a cost of one hundred thousand pounds, and opened in 1881), a school of art, an arboretum, a spacious theater; several fine public halls, including the Albert, seating about three thousand persons; a Gothic fountain, erected as a memorial of John Walter of the *Times*, for a short time member of Parliament for the town; and a statue of the late Samuel Morley who also represented Nottingham in Parliament; high schools for boys and girls, middle schools and 57 primary schools, Blind Institution, Art Museum, free public libraries, Mechanics' Institute, People's Hall (founded by G. Gill). Here is produced nearly all the British machine-made lace. For making machines for the lace trade there are, in Nottingham, shops and large factories. The markets for corn and cattle are among the largest held in the midland counties. Several fairs take place annually, the most important being the "Goose Fair" in October. There is a fine race-course to the northeast of the town. Nottingham publishes four daily newspapers. The Parliamentary borough is divided into three districts, each of which returns one member: East Nottingham, population, 75,794; South Nottingham, 72,046; and West Nottingham, 92,037. The castle, fired by rioters, Oct. 8, 1831, on the rejection of the Reform Bill by the House of Lords, remained a ruin till 1877, when the property was leased to the corporation of Nottingham for five hundred years, and was restored at a cost of thirty thousand pounds for the purposes of a Fine Arts Museum, opened in 1878.

NOUKHA, a town of Russia, in Transcaucasia, built on the southern slope of the Caucasus Mountains, 80 miles S.W. of Derbend. It is inhabited by native Tartars belonging to the Mohammedan creed, by Armenians, and a few Russians, chiefly officials. Breeding the silk-worm is the staple branch of industry. The native breed of silk-worms is somewhat coarse, and is now being supplanted by the Italian breed.

NOVACULITE, an exceedingly compact form of hornstone which is used as a hone or whetstone for sharpening knives. See also MINERALOGY, Vol. XVI, p. 405.

NOVALES, the pseudonym of HARDENBERG, FRIEDRICH VON, Vol. XI, p. 422.

NOVA SCOTIA, called by the French Acadia, and now one of the maritime provinces of the Canadian Dominion, for an account of which see NOVA SCOTIA, Vol. XVII, pp. 616–618. Much of the land is still covered by forests, which produce much fine timber, and there are large and valuable coal-deposits, which form a considerable source of the provincial revenue. Along the shores of the Bay of Fundy there are rich dike-lands, which have been cultivated for centuries by the Acadians and their modern French and Scottish descendants, and where the apple and other fruits flourish. The transportation facilities of the province are still mainly those of the steamship lines, there being but 825 miles of railway. The Intercolonial railroad, which has its eastern terminus at Halifax, connects the province with the west. The population, in 1901, was 459,574, of whom 122,452 are Roman Catholics. The Presbyterians come next, with a membership of 108,520. Capital, Halifax. Pop. (1901), 40,832.

Though there is now a school of agriculture in Nova Scotia, farm products are not much of a source of revenue. Wheat is cultivated but little. Hay, oats and potatoes are the chief products raised. In 1891 the hay-yield was 63,000 tons; oats yielded 1,500,000 bushels, and the potato crop exceeded 5,000,000 bushels. In the same year there were 9,000,000 pounds of butter and 600,000 pounds of cheese manufactured. The yield of wool was over a million pounds, while the apple crop of the year exceeded 1,000,000 bushels. The following are the census returns of the live-stock on farms for 1891: Horned cattle, 309,776; horses, 62,419; sheep, 318,885; swine, 45,760.

The fisheries are a large and profitable industry in Nova Scotia. The number of men engaged in this pursuit in 1899 was close upon 5,325 in vessels and 11,305 in boats, with a total investment in the trade of $3,080,000. The value of the fish-catch of the province was, for 1899, $7,347,604, of which $5,000,000 worth was exported. The chief catch was of cod, lobsters, herring and mackerel. The increase in this trade in the last ten years was in value over a million dollars.

Coal-mining is the most important industry of the province, the output of which was, for the year 1900, nearly 3,357,000 tons. The production of this commodity during the last ten years exceeds 26,000,000 tons. Much of the current output is sold to the neighboring provinces, and about ten per cent is exported to Newfoundland and other countries. Gold-mining is another profitable industry in the province, the yield from which, between the years 1862 and 1899, was, in round figures, 15,000 ounces from 40,000 tons of quartz crushed. The average yield in value is about $14.50 a ton. The area of the provincial gold-measures has been estimated to be from five to seven thousand square miles. There are 35 localities in the province in which workable deposits of gold have been found, and from three thousand to four thousand persons are engaged in or dependent on the industry. The returns show that as yet only forty square miles has been worked partially, from which $15,000,000 worth of the metal has been mined since the discovery of the gold. The yield in 1900 was in value $607,152.

The other industries of Nova Scotia are shipbuilding, fish-canning, sugar-refining, and the manufacture of woolen goods, cotton duck, glassware, boots and shoes, gunpowder and other explosives. The annual revenue of the province is about $1,000,000, $432,800 of which is the Dominion subsidy; while over $400,000 is raised annually from a tax on the mines. The provincial debt has nearly trebled in the last ten years; the gross debt in 1900 was a little over $4,000,000, with total assets of one and a third millions. The province has a legislature of 38 members, including an executive of 9 ministers, of whom 6 are without portfolios.

They represent the population of 18 counties. There is also a legislative council of twenty members. Nova Scotia is represented in the Federal Parliament by 10 members in the Senate and 20 members in the Commons. Education in the Province is represented by 6 colleges, 1 normal school and 2,417 common schools. The latter are supported by direct taxation upon the municipalities and by an annual government grant (year 1900) of $248,309, or of $887,852 for the whole purposes of education. The enrolled attendance in the public schools in 1900 was 100,129, and the average attendance 56,224.

NOVA SCOTIA SHIP RAILWAY. See CHIGNECTO BAY, in these Supplements.

NOVEL. See ROMANCE, Vol. XX, pp. 648–678.

NOVELLO, JOSEPH ALFRED, an English organist, composer and musical publisher; born in London in 1810. He was the eldest son of Vincent Novello (born 1781). The father rose to a high position in the English musical world, and had three daughters, Cecilia, Mary and Clara, the last being the greatest oratorio singer of modern times, becoming Countess Gigliucci in 1843. The father published editions of sacred music as early as 1811. At the age of 19, Joseph Alfred established himself as a musical publisher, and shortly afterward invented a process of printing music which revolutionized the sale of cheap music. He was a friend of Felix Mendelssohn, and in 1847 published *The Messiah* and *The Creation*, and adapted the English text to the *Lobesang* and *St. Paul*. These works were issued at low prices. The house has published 67 oratorios and many works of the standard composers at the uniform price of one shilling, produced in the best manner, equaling any work turned out by continental firms. His house became the greatest music-publishing house in the world, and to him can be given the credit of first bringing music within the reach of "the masses." To him was due the abolition of the printers' guild law, and he was actively engaged in the repeal of the advertisement duty, the paper duty, the stamp on newspapers, and other imposts known as "taxes upon knowledge." He aided Bessemer in producing the metal known by the name of the latter. In 1856 he retired from business and went to reside at Nice, whence he removed to Genoa. In Italy he was made one of the four commissioners to look after the interests of the British shareholders in the Italian Irrigation Company (Cavour canal), involving £5,000,000 of British money. He devoted much attention to the construction of ships, and published an *Epistle to Naval Architects*. He died in Genoa, July 17, 1896.

NOVOROSSICK, a seaport town of Russia, on the E. coast of the Black Sea, 30 miles S.E. of Anapa; is the terminus of a railway opened in 1888. The town is built on a slope terminating in lofty heights, and is defended by forts. Population 1897, estimated 10,000.

NOYES, JOHN HUMPHREY. See ONEIDA COMMUNITY, Vol. XVII, pp. 794–795.

NUBAR PASHA, Egyptian statesman; born in Smyrna, Jan., 1825, of an Armenian Christian family. He was educated in Switzerland and in France. In 1842 he became secretary of Bogos-Bey, who was then Minister of Foreign Affairs in Egypt. Two years later he was made secretary-interpreter to Mehemet Ali, and afterward to Ibrahim Pasha. In 1866 Ismail Pasha made him Minister of Foreign Affairs, and sent him to Constantinople to obtain from the Sultan the title of Khedive for himself. Nubar Pasha's efforts were directed to introducing European customs into the administration of Egyptian affairs. In 1878 he became president of the Egyptian Cabinet. But he was compelled to resign after six months. In 1884 he was called to the head of affairs again, when his administration proved even more acceptable to the Egyptians than before. He came into collision with the British policy, and as a result of his financial recommendations was dismissed by Tewfik, June 8, 1888. He was recalled in 1894 by the new Khedive, Abbas Hilmi, son of Tewfik. He resigned Nov. 11, 1895, on account of failing health, having been in the service of the state 53 years. Died in Paris, Jan. 14, 1899.

NUBIA. See AFRICA, in these Supplements.

NUCLEOBRANCHIATA, a group of mollusks. On grounds of priority, the term *Heteropoda* is now adopted. See HETEROPODA, in these Supplements.

NUCLEO–PLASM. See HEREDITY, in these Supplements.

NUCLEUS, in botany, one of the essential organs of a plant-cell. It is usually a roundish body, imbedded in the cytoplasm, and consists of a variety of proteid substances. In its resting-stage it is bounded at the surface by a membrane, and consists of a semi-fluid clear ground-substance (*paralinin*), in which lies a fibrillar network of denser substance (*linin*), in which are distributed granules of *chromatin*. Other bodies lying in the ground-substance are known as *nucleoli*, whose history is still problematical. In ordinary cell-division the nucleus passes through a remarkable series of changes, which have been described under KARYOKINESIS in these Supplements.

NUCLEUS, of the Earth. See GEOLOGY, Vol. X, pp. 199–202.

NUDIBRANCHIATA, a group of opisthobaruchiate gasteropod mollusks, which have no mantle or shell. Gills are sometimes present, and hang freely into the water, hence the name, signifying naked gills. The larval form possesses a shell. Most of these mollusks live near the shore. The group contains numerous species, mostly in the warm seas. *Doris*, *Æolis* and other genera are common along the coasts of the United States.

NUEVO LEON, a state of eastern Mexico, included within the states of Tamaulipas on the northeast and east, San Luis Potosi south and southwest and Coahuila west and north, having an area of 23,592 square miles. It is traversed by the eastern Sierra Madre, running from northwest to southeast, and is watered by three principal rivers, the Salado in the north, the Sans Juan in the center and the Del Tigre in the south. A considerable part of the territory on the southwest of the Sierra is in the Mexican plateau, having an elevation of about 6,000 feet. On the northeast slope of the mountains there are low lands or plains extending

toward the Rio Grande. The climate varies with the elevation, being mild and agreeable on the mountain slopes and the plateau, and hot and unhealthy in the low lands. The products, largely agricultural, include maize on the plateau and sugar-cane in the lower districts. The mineral wealth of the state is considerable, but the mines are not extensively worked. The population, a large part of which resides along the northeastern slope of the Sierra, by the census of 1900, was 326,940.

NUISANCE, in law. See NUISANCE, Vol. XVII, pp. 627–628; and ABATEMENT, in these Supplements.

NULLIFICATION, in the history of the United States, the action of the legislature of South Carolina, in 1832, declaring certain acts of Congress unconstitutional, and therefore null and void. See CALHOUN, Vol. IV, p. 606; and WEBSTER, Vol. XXIV, p. 499.

NUM OR NUMRA, an Egyptian deity. See EGYPT, Vol. VII, p. 620.

NUMBERING-MACHINE. Blank-book manufacturers and printers use a variety of machines for consecutively numbering the pages of account-books, tickets of admission and the like. The most simple are in the form of a hand-stamp, bearing figure-wheels below. With these, pressure on the handle brings down the wheels so that a number is printed. A spring then automatically turns one of the figure-wheels, so that the next consecutive number is brought into place, and with the same motion the figures are inked for another impression. The larger machines work on similar principles, but are operated by treadle or power, while the work to be numbered is fed in, somewhat as in a treadle printing-press.

NUMIDIDÆ, a family of African birds, including the well-known guinea-fowls. The heads are bare, crested, or with a small feathered patch. The birds are noted for their peculiar shrill voice. The common domesticated guinea-fowl is *Numida meleagris*. See GUINEA-FOWL, Vol. XI, p. 234.

NUMMULINIDA, a family. See FORAMINIFERA, Vol. IX, pp. 334–338, 340.

NUNCIO. See AMBASSADOR, Vol. I, p. 577; and LEGATE, Vol. XIV, p. 413.

NUNDA, a village of Livingston County, central western New York, 18 miles S.S.W. of Geneseo, on the Erie and the Western New York and Pennsylvania railroads. It has furniture, shoe, knife and casket factories; is on the Genesee Valley Canal, and is a summer resort. Population 1900, 1,018.

NUÑEZ, RAFAEL, author and statesman, was born at Cartagena, Colombia, on September 28, 1825, and became interested in war, politics, and literature. He was proclaimed president of Colombia on April 1, 1880, to succeed President Zyaldua, and was regularly elected president in September, 1883, and again in August, 1886, for a term of six years. He was elected a third time in 1892, and died in office on September 18, 1894. He was at one time the editor of a Spanish paper in New York City, and was the author of a number of brilliant works in prose and poetry, including *Ensayos de Critica Social*, and *La Reforma Politica en Colombia*. W.F.J.

NUNIVAK, an island of Alaska, in Bering Sea, off Cape Vancouver, lat. 60° N., long. 165° to 167° W.; length of island, 70 miles, and about 30 miles wide; peopled by Esquimaux, who trade in fox-skins, oil and ivory.

NUN OF KENMARE, THE. See CUSACK, MARY FRANCES, in these Supplements.

NUR-ED-DIN, MAHMOUD MALEK-AL-ADEL, a Sultan of Syria, the son of Zengui, or Omad-ed-din, who ruled over northern Syria; was born in Damascus in 1117, and obtained the sovereignty of Aleppo on the death of his father by poisoning at the hands of the eunuchs, at the siege of Jabbar in 1145. He resisted the Christian crusaders, defeated Joscelin de Courtnay, Count of Edessa, and Raymond, Prince of Antioch, whose head he sent as a trophy to the caliph at Bagdad. He then made himself master of Damascus. As a ruler he exhibited the quality of prudence, and as a warrior he was one of the heroes of the Moslem faith. He was a patron of the arts and sciences, and founded cities, establishments of learning, hospitals and mosques. The first employment of pigeons as carriers of messages has been ascribed to him. He died suddenly at Damascus, while preparing to set out for Egypt, in the year 1173. For his struggle with the Templars, see TEMPLARS, Vol. XXIII, p. 176; and for his operations in Egypt, see EGYPT, Vol. VII, pp. 652–653.

NURSERY CULTURE. See ARBORICULTURE, Vol. II, pp. 281, 282.

NURSE-SHARK, a local name for sharks of the genus *Somniosus*. They are large fishes of the cold northern seas. The name probably refers to their habit of resting or basking for long periods of time. Some of these sharks reach a length of twenty feet. A smaller shark (*Ginglymostoma*) of the tropical Atlantic has been sometimes called nurse-shark.

NURSING. (For preliminary account, see HOSPITAL, Vol. XII, p. 319.) Fifty years ago a well trained and qualified nurse was almost unknown, and consequently the care of the sick often devolved upon persons totally unfit for and ignorant of the duties required of them. That time is fortunately passed. Well-educated women are now to be obtained from various institutions at moderate rates,—women who are regarded by medical attendants as most valuable assistants.

One of the earliest, if not the very first, of the training institutions for nurses of a superior class, was the St. John's Sisterhood, founded in 1848 in London. It is now, with its affiliated institution, the Nursing Sisters of St. John the Divine, under the patronage of the Archbishop of Canterbury, and has a very influential council or committee, and a large staff of nurses, some of whom are laboring gratuitously amongst the poor. Much care is taken in their selection, and they are trained carefully.

After the Crimean War, a great impulse was given to the movement, in commemoration of the heroic self-denying labor of Miss Florence Nightingale (q.v., in these Supplements), and a fund was raised for the purpose of training hospital nurses. In 1887, Queen Victoria devoted the surplus of the Women's Jubilee Offering, amounting to $350,000.

to the foundation of a scheme for the training of nurses. The interest of this sum, about $10,000, is employed in the maintenance of central institutions, where nurses are trained for this special work. There are, at present, four of these centers,—in London, Edinburgh, Dublin and Cardiff. Nurses who have gone through the required training at any of these homes are eligible to be entered on the roll of the Queen's Institute, and are entitled to wear the badge as Queen's nurse.

The army and navy nurses of Great Britain must all be women of good social position, and are required to undergo three years' training in a general hospital. They are called Her Majesty's Nursing Sisters, and may be ordered on active service in any war. As a reward for special service they receive the order of the Royal Red Cross. The Royal National Pension Fund, an insurance company for nurses, was founded in 1887. In 1889 four English gentlemen placed $100,000 at the permanent disposal of the fund, to afford nurses a safe means of providing an allowance during sickness and a certain income when their strength is declining. On the continent of Europe the employment of male nurses to attend male patients is common, and in the Roman Catholic countries the nursing of the hospitals is for the most part in the hands of Sisters of Mercy. In Germany a great impetus was given to improvements in nursing by the interest shown in the matter by the late Empress Augusta, the Empress Frederick and the late Princess Alice of Hesse. The training of nurses on the lines adopted in Great Britain was instituted in Paris during 1877, by the establishment of *L'École de Garde-malades et d'Ambulancières*. In America the practice of nursing is very thoroughly taught in many of the hospitals, particularly those in the Northeastern states, such as the Bellevue Hospital in New York, the Long Island Hospital in Brooklyn, the Philadelphia and Pennsylvania hospitals in Philadelphia, and many others.

One of the leading Western schools is the Illinois Training-School, in Chicago. This school is a large one, giving the fullest training possible, both practical and theoretical. Class-instruction is given by the superintendent and her assistants, and lectures by some of the most prominent physicians of the city. The practical training is obtained in the private rooms, wards and operating-rooms of the Presbyterian and Cook County hospitals, embracing the care of medical, surgical, gynæcological and obstetrical patients, the care of sick children, and special or private duty nursing. The practical work is supervised by the officers of the school and by the head nurses, many of whom are graduates. The number of pupils is generally about 130, varying a little from month to month; besides the pupils, there are 12 graduate head nurses and from 10 to 20 probationers.

The work of a nurse is very hard, but, by judicious arrangement of the hours of work, recreation, sleep and meals, this is in a large measure compensated for. The three years' course was inaugurated in June, 1896, by means of which it is hoped that the strain of the hardest mental and physical work, which used to come at the same time, will be lessened. All training-schools for nurses in the country have improved greatly in all respects during the last ten years, particularly in the theoretical instruction and the details of practical work. Discipline is an important point in the training of nurses; it is also a great advantage to have the home in a building apart from the hospital where the work is done, thereby giving the nurses greater relaxation when off duty and taking them entirely away from the atmosphere of sick people. Every large city has several schools, and many of the smaller cities have at least one. Some of these give training in only one or two branches, others in all but one or two, while comparatively few give a complete course, embracing all branches.

It is quite evident that the results of the establishment of training-schools for nurses to care for the sick in hospitals has been most satisfactory, because the number has increased constantly and rapidly. The best proof of this is the fact of the increasing demand for graduates of training-schools to care for the sick in their own homes, and to take charge of new schools and hospitals, or to fill the places of non-graduates who have formerly held hospital positions. The profession supports a weekly journal, *The Trained Nurse*, published in New York City.

The following gives a synopsis of the three years' course of the Illinois Training-School:

Class-Work. Elementary anatomy and physiology, *materia medica*, and practical nursing, embracing the whole care of ordinary medical, surgical and gynæcological patients, with text-books, models and demonstrations.—*Lectures.* On hygiene, anatomy and physiology; on *materia medica*, bacteriology; on surgical, medical and gynæcological nursing.—*Cooking Lessons.* Practical and theoretical work.—*Class-Work.* Obstetrical nursing, care of the new-born, care of children, special nursing, care of operation patients, private duty, surgical technique and operating-room work.—*Lectures.* Obstetrics, special gynæcological work, the care of sick children, the examination and testing of urine, care of the nervous and insane, advanced medical and surgical subjects. No class-work.—*Lectures.* Eye, ear, throat, skin, electricity, massage, training-school administration. During the senior year nurses will serve as head nurses, and special nurses to private patients in the Presbyterian Hospital. It is designed to finish as nearly as possible the theoretical training during the first two years, thus relieving special and head nurses of that excessive mental application heretofore demanded by the shorter course.

NUSAIRIEH. See ANSARS, in these Supplements.

NUTATION, a term in physiological botany to denote certain spontaneous changes in the position of growing-points,—a movement common to all growing-points, but especially noticeable in slender structures, such as tendrils. By reason of this nutation the path described by the growing-point is not a straight line, although the axis of the organ may become permanently straight, but a spiral whose section is circular or elliptical. In the case of flat organs, such as a leaf, the path of the nutating growing-point is a zigzag line.

NUTATION. Of the equinoxes, see ASTRONOMY, Vol. II, pp. 694, 695. Of tides, see Vol. XXIII, pp. 384–385. In geology, see Vol. X, p. 201.

NYACK, a village of Rockland County, New York, in the southeastern part of the state, on the

west bank of the Hudson River, at the northern end of the Palisades, twenty-five miles north of New York city. It is a favorite place of residence, and has manufactories of musical instruments, boots and shoes, yachts, engines, etc. It is reached by the Erie and New York, Ontario and Western railroads, and had in 1900 a population of 4,275. W.F.J.

NYANGWE, an Arab trading station on the Upper Congo, or Lualaba, at the edge of the Manyema country, in 4° 13′ S., 26° 21′ E. From that point Henry M. Stanley commenced the descent of the Lualaba in 1876.

NYASA, the southernmost of the equatorial great lakes of East Africa, situated about 260 miles S. E. of Tanganyika, and 400 inland from the east coast. It lies at an altitude of 1,575 feet, is very deep in the middle, and shelves rapidly from the shores, which are rocky and high. Long and narrow, it measures 350 miles from north to south, and an average of 25 miles from east to west, and has an extreme depth of over 200 fathoms. The river Shiré emerges at its southern extremity, and flows south to the Zambezi. The waters of the lake are sweet, and abound in edible fish. Although the Portuguese had knowledge of the existence of the lake under the name of Maravi early in the seventeenth century, Livingstone was the first to fix, in 1859, its exact situation and to navigate it. He found a numerous population in the mountains (which rise from 10,000 to 12,000 feet above the level of the lake), growing maize, cassava, tobacco, and English peas, which had been introduced by Arab traders.

NYÂYA PHILOSOPHY. See SANSKRIT, Vol. XXI, p. 305; and BRAHMANISM, Vol. IV, pp. 188, 189.

NYCTAGINACEÆ, a family of dicotyledonous plants characterized by the funnelform or tubular calyx, colored like a corolla, and falling away from a persistent lower portion, which completely closes over the seed-like fruit, and in some genera becomes winged. The species are found especially in the tropics of South America. The best-known genus is *Mirabilis*, whose species, known as four-o'clocks, are extensively cultivated as ornamental plants.

NYCTITROPIC, a term in physiological botany to denote certain movements of leaves, by which they shift their position so as to vary the surface-area presented to the sky. As these movements are usually associated with the alternation of day and night, they are called sleep-movements, or nyctitropic movements. The nyctitropic movement, caused by diminished intensity of light and falling temperature, reduces the surface-exposure of the leaves, either by presenting their edges to the zenith, or, in compound leaves, by folding the leaflets together.

NYE, EDGAR WILSON, an American humorist; born in Shirley, Maine, Aug. 25, 1850. At the age of two years his parents removed to St. Croix County, Wisconsin, and the boy received his early education at Rivers Falls. He studied law in the same state and practiced for a short time. In 1875 he settled in Laramie, Wyoming, and having contributed several successful articles to the press, in 1880 was invited to contribute to the *Tribune* of Denver, Colorado. The next year he established, at Laramie, *The Boomerang*, in which he "wrote up" that town in the style characteristic of "Bill Nye," the name by which he was always known in the press. This effort inverted the usual proportions and order of things, exaggerating the small things, such as a peanut-stand into a mammoth enterprise, and minimizing the greater institutions and persons, and so on. The inhabitants were sensible enough to enter into and enjoy the joke, and showered honors on the genius who had drawn attention to their town. While editing *The Boomerang*, he was made a justice of the peace, postmaster, school superintendent, United States commissioner, and a member of the legislature. *The Boomerang*, however, had not scope enough in Laramie, and Nye was obliged to suspend its publication. He returned to Wisconsin, and lived and wrote in Hudson for some years, when he was enticed to New York to work on a salary which to him appeared fabulous. His first book was published at Chicago in 1881, its title being *Bill Nye and the Boomerang*. He then entered into an arrangement with James Whitcomb Riley for a joint lecturing tour. He also appeared as a playwright in 1891, when *The Cadi* was produced at Union Square Theater, in New York city. He also wrote *The Stag Party*, in collaboration with Paul Potter. His other works are *The Forty Lyars and Other Lies* (1883); *Baled Hay* (1884); *Bill Nye's Blossom Rock* (1885); *Remarks by Bill Nye* (1886); *Bill Nye's Thinks* (1888); *Bill Nye's History of the United States* (1894). *Bill Nye's History of England* was the latest work he produced. Died at his home at Buck Shoals, near Asheville, N. C., whither he had gone for his health, Feb. 22, 1896. *Revised by* R.W.C.

NYEZHIN, NIZHAN, OR NEJIN, an ancient town, in Chernigof government, Russia, on the Oster, 80 miles N.E. of Kiev. It is an industrious place, many of the inhabitants being descended from Greek immigrants who settled there during the reign of Catherine II. Its chief industry is tobacco-growing, and large quantities of leaf tobacco are sent to St. Petersburg, Riga, and Mittau. It fell into the hands of the Lithuanians in 1320, and of the Poles in 1386, but was annexed by Russia in 1654. Pop. 1897, 32,108.

NYKÖPING, a seaport of Sweden, 62 miles S.W. of Stockholm; manufactures machinery, cotton, steamboats, locomotives, steam-engines, and cloth; port has a depth of 13 feet at entrance; the quay has a length of 1,213 feet. The castle, now ruined, ranked in point of strength next to those of Stockholm and Calmar. King Waldemar was imprisoned here after his dethronement in 1288 till his death in 1302. Population 1900, estimated 7,500.

NYMPHON, a genus of insects. See ARACHNIDÆ, Vol. II, p. 243.

O

OAK—OAXACA

OAK, the common name of species of *Quercus*, a genus of forest trees too well known to need extended description. Their variable but usually lobed leaves, their characteristic fruit, the acorn, and their valuable wood, have made them familiar plants to all nations and throughout history.

OAKELEY, Sir Herbert Stanley, an English composer, the second son of Sir Herbert Oakeley; born in Ealing, Middlesex, July 22, 1830. He was educated at Rugby School and at Christ Church, Oxford, (B.A. 1853, M.A. 1855). After having graduated he went abroad to complete his studies in music, for which, from earliest childhood, he had shown a marked predilection. At Leipsic he studied pianoforte-playing under Professors Moscheles and Plaidy, and at Bonn organ-playing under Dr. Breidenstein, professor of music in that university, and afterward under the great organist Dr. Johann Schneider of Dresden. While resident in London he acted for some years as musical critic and correspondent. In 1864 he was enrolled in Rome as member of the Society of "Quirites." In 1865, on the death of Professor Donaldson, he was elected professor of music in the University of Edinburgh. In 1871 he received the degree of doctor of music from the Archbishop Tait of Canterbury. In recognition of musical services for Scotland, the honor of knighthood was conferred on him in August, 1876. In 1879 his own university, Oxford, gave him the degree of Mus. D., *honoris causâ*; and in 1881 that of LL.D. was presented to him by the University of Aberdeen, and in the same year he was created composer for the Queen in Scotland. In 1887 he received the degree of Mus. D. from Dublin University. He wrote for the church, for chorus, orchestra, organ and pianoforte, and published vocal quartets, etc., including a *Jubilee Album*, dedicated to the Queen, and a *Jubilee Cantata* (1887). He originated the Reed concerts in Edinburgh, and prepared a scheme for musical graduation in the University of Edinburgh. He died October 27, 1903.

OAK HARBOR, a village of Ottawa County, northern Ohio, near Port Clinton, 15 miles from Sandusky, on the Portage River and the Lake Shore and Michigan Southern railroads; has saw and planing mills, and manufactures of sashes, blinds, wagons and lumber. Population 1900, 1,631.

OAKLAND, a city of Alameda County, California. It is essentially a residence city for San Francisco business men, and hundreds of fine residences are to be seen just outside the business portion of the town. The transportation facilities include both street-cars, the Southern Pacific railroad and ferry-boats.

The following figures taken from the census of 1900 will show something of the business of Oakland: Number of mechanical and manufacturing industries reported, 752; aggregate capital invested, $6,364,651; average number of employees, 4,359; total amount of wages paid, $2,448,861; total value of products, $9,174,257. In 1900 there were 21 public schools, 2 colleges, the Pacific Theological Seminary (Congregational), 7 private academies, a private normal school, 8 libraries and 4 daily papers. Population 1890, 48,682; 1900, 66,960. See also Oakland, Vol. XVII, pp. 713–714.

OATES, William C., an American public man; born in Pike County, Alabama, Nov. 30, 1835. He was self-educated, studied law, was admitted to the bar in 1858, and became a successful lawyer and business man; entered the Confederate army as captain of Company G, Fifteenth Alabama Infantry, in July, 1861; was appointed colonel in the provisional army of the Confederate States, May 1, 1863, and was assigned to the command of his old regiment; the Forty-eighth Alabama Regiment also was placed under his command subsequently. He was wounded four times slightly and twice severely, losing his right arm in front of Richmond, Aug. 16, 1864, in the twenty-seventh battle in which he was engaged. In 1868 he went as a delegate to the national Democratic convention held in New York which nominated Seymour for the Presidency; was a member of the Alabama house of representatives and chairman of the committee on ways and means at the sessions of 1870–71 and 1871–72. He was a member of the constitutional convention in 1875, and chairman of its judiciary committee; and was elected to Congress for the Third Alabama District in 1881, and served several subsequent terms.

OATS, the popular name of *Avena sativa*, or of its grain, a grass of the Old World, whose cultivation is recorded from the most ancient times. It is soft and smooth, with a loose panicle of large drooping spikelets, one flower of which has a long twisted awn on the back.

OATS IN THE UNITED STATES. See Agriculture, in these Supplements.

OAXÁCA, Mexico, a maritime state on the Pacific coast, bounded north by the state of Vera Cruz separating it from the Gulf of Mexico. It has an area of 35,382 square miles, traversed west to east by the Sierre Madre Mountains with a parallel range on the south and spurs projecting northward; it is drained by the Rio Verde, Tehuantepec, Tehuacan, Trinidad, Copalita and Yogondoi rivers. An export trade in gold, farming and forest products, etc., is facilitated by a railway across the Isthmus of Tehuantepec and the Mexican Southern railroad penetrating to Oaxáca, the capital. Pop., 1900, 947,910. C.L.S.

OAXÁCA, Mexico, capital of Oaxáca, a city on the Rio Verde in the Sierre Madre Mountains, and on the Mexican Southern railroad, 230 miles

S. E. of Mexico city. It was the Aztec *Huaxyacac* founded by Montezuma's soldiers in 1486, and is one of the handsomest cities of the Republic, with various manufactures and an active trade. Population, 33,000. C.L.S.

OB OR OBI, a bay and river of SIBERIA; q. v., Vol. XXII, p. 9.

OBAN, a seaport town on a bay of the same name, in Argyleshire, Scotland, on the Sound Kerrera, 20 miles N. W. of Inverary, a terminus of the Caledonian railroad; a place of call for coast excursion steamers; has manufactures of silk and straw hats, and exports whisky, fish, pig-iron, wool, kelp and slates; has a fine harbor, with twenty fathoms of water, and a pier 250 feet long and 30 feet wide; is a great resort for tourists. It has fine hotels and many villas on the heights overlooking the town. To the north are the ruins of Dunolly Castle, and three miles away is Dunstaffnage Castle, a place of very early Scottish kings. Oban is a Parliamentary borough, and its scenery is enchanting. Population, about 5,000.

OBEID, EL. See EL OBEID, Vol. VIII, p. 141.

OBER-AMMERGAU PASSION PLAY (1900). Ober-Ammergau is a picturesque village in Bavaria, 45 miles S. W. of Munich, famed for the Passion Play performed there at intervals of ten years, by the peasants of the village and district. The play, which represents in a very serious and realistic manner the passion and death of Christ, was instituted as far back as 1634, in token of gratitude, on the part of the simple villagers, for the abatement of a plague. The decennial representations extend over the summer months, from May to September, and attract large numbers of visitors from all parts of the world. The performances, which are given three times a week (usually on Sunday, Monday, and Friday), extend from 8 a. m. to 5 p. m., with a mid-day intermission of an hour and a half. The cast numbers about 600 performers (about a third being children), and all are chosen for their several parts by the inhabitants themselves. Ober-Ammergau is the only place where the mystery or miracle play is now performed, in true mediæval fashion. Humble and religious as are the villagers, the performance is most artistic as well as impressive; and though severe in its simplicity the whole is admirably staged, with dramatic regard for the massing of the performers, for the grouping of the principal actors, for the combination of color in the dresses of the chorus, and for effective scenic display. The building in which the performance is given will seat several thousand spectators, and with its partially open ends and spans of iron girders rather resembles a huge railway station than a modern theatre.

The chief characters in the play, who, as has been said, are the inhabitants of the village, and are locally known as Herod, Pilate, Caiaphas, St. John, etc., seem to have been selected for their parts with an eye for dramatic effect, aided by religious instinct and pious training. In the performance of 1900, the speaker of the Prologue, Josef Meyr, was he who took the part of Christus ten years previously. His acting was characterized by dignity of manner and appearance, as, staff in hand, he led on to the stage one wing of the chorus, clad in "gold-bordered white dresses, with colored cloaks, also gold-bordered, and clasped across the breast." The other chief members of the cast were, in 1900, as follows: Caiaphas the High Priest (Sebastian Lang); Judas (Johann Zwink); Peter (Thomas Rendl); John (Peter Rendl); and Christ (Anton Lang). Each appeared and acted his part with striking and characteristic fitness. The personations of Peter, of "the beloved disciple," and of our Lord were specially distinctive and impressive, the effect being heightened in each case by fine personal appearance and tender acting. The Judas was also an effective personation, whose rendition of the forbidding rôle was so dramatic as to bring tears to the eyes of the spectators, and caused many a heart to ache. The most striking of the tableaux were the entry of Christ into Jerusalem, the Parting at Bethany, the Last Supper, the Agony in the Garden, the Despair of Judas, the Condemnation of Jesus, the Way of the Cross, the Crucifixion, supplemented by scenes representing the Resurrection and the Ascension. G. MERCER ADAM.

OBERLIN, a village of Lorain County, northern Ohio, 7 miles S. W. of Elyria and 35 miles W. of Cleveland, on the Cleveland, Lorain and Wheeling and the Lake Shore and Michigan Southern railroads; the seat of Oberlin College (q. v. below); has a bank, a plaining mill, a flour mill, a carriage factory, and 3 newspaper offices. Population 1890, 4,376; 1900, 4,082.

OBERLIN COLLEGE, a non-sectarian co-educational institution located at Oberlin, Ohio. It was founded in 1833 as a private institution, and chartered in 1834 as Oberlin Collegiate, and in 1850 as Oberlin College. It is divided into the theological, collegiate, and preparatory depart-

PETERS HALL, OBERLIN COLLEGE.

ments. Especial attention is given to the teaching of music. The theological department is not under the direct control of any denomination, but is indirectly associated with the Con-

gregationalists. In 1904 the value of the institution's property, including its endowment, was $2,355,000. In the same year there were 95 instructors, and 1,618 students. The library contained 75,000 volumes. The number of graduates from 1833 to 1898 was 3,415. Henry Churchill King, D.D., is president. *Revised by* R.W.C.

OBESITY. See CORPULENCE, Vol. VI, pp. 385, 386; and PATHOLOGY, Vol. XVIII, pp. 397, 398.

OBITUARIES, NOTABLE AMERICAN AND FOREIGN (1899–1900).

Allen, Grant, English author, Oct. 25, 1899.
Argyll, George Douglas Campbell, Duke of, April 24, 1900.
Bidwell, General John, Am. Prohibitionist, April 4, 1900.
Blackmore, Rich. D., Eng. novelist, Jan. 21, 1900.
Bland, Senator, June 15, 1899.
Bonheur, Rosa, animal painter, May 25, 1899.
Bunsen, Prof. R. W. E., physicist, Aug. 16, 1899.
Busch, Moritz, German author, Nov. 16, 1899.
Castelar, Emilio, Spanish statesman, May 25, 1899.
Cherbuliez, Victor, French novelist, July 1, 1899.
Church, Fred. Edwin, Am. artist, Apr. 7, 1900.
Coues, Elliot, American naturalist, Dec. 25, 1899.
Crane, Stephen, Am. novelist and war correspondent, June 5, 1900.
Daly, John Augustin, Am. dramatist, June 7, 1899.
Dawson, Sir J. Wm., Canad'n geologist, Nov. 19, 1899.
Dingley, Nelson, Am. legislator, Jan. 13, 1899.
Edinburgh, Duke of, Saxe-Coburg and Gotha, July 30, 1900.
Erckmann, Emile, French novelist, Mar. 14, 1899.
Faure, F. F., President of France, Feb. 16, 1899.
Field, Mr. Justice Stephen I., April 9, 1899.
Field, Mr. Justice Walbridge A., June 15, 1899.
Flagler, Brig.-Gen'l Daniel A., Mar. 29, 1899.
Flower, ex-Governor Roswell P., May 12, 1899.
Forbes, Arch'd, Eng. war correspondent, Mar. 29, 1900.
Foster, Birket, English artist, Mar. 28, 1899.
Grove, Sir George, English writer on music, May 28, 1900.
Henry, Brig.-Gen'l Guy V., U. S. A., Oct. 27, 1899.
Herschell, Lord Farrer, Eng. jurist, Mar. 1, 1899.
Hobart, Garret A., Vice-Pres. U. S., Nov. 21, 1899.
Huntington, Collis P., Am. railway magnate, Aug. 13, 1900.
Ingalls, John J., American senator, Aug. 16, 1900.
Ingersoll, Robt. G., Am. lawyer and orator, July 21, 1899.
Joubert, Petrus J., Boer general, Mar. 27, 1900.
Kingsley, Miss Mary, English scientist and traveller, June 3, 1900.
Logan, Major John A., U. S. A., Nov. 12, 1899.
McGlynn, Rev. Dr. Edward, R. C. priest, Jan. 7, 1900.
Marryat, Florence (Mrs. Lean), Eng. novelist, Oct. 27, 1899.
Marsh, Prof. Othniel C., Am. paleontologist, Mar. 18, 1899.
Martineau, Rev. Dr. James, Eng. theologian, Jan. 11, 1900.
Mivart, Dr. St.-George, Eng. (R. C.) scientist, Apr. 1, 1900.
Monier-Williams, Sir Monier, Eng. Sanscrit scholar, Apr. 11, 1899.
Morrill, Justin S., U. S. Senator, Dec. 28, 1898.
Munkácsy, Mihaly, Hungarian painter, May 1, 1900.
Muravieff, Count Michael, Russian statesman, June 21, 1900.
Oglesby, Rich. J., U. S. Senator, Apr. 24, 1899.
Paget, Sir James, Eng. surgeon, Jan. 3, 1900.
Phelps, Hon. Ed. John, Am. diplomatist, Mar. 9, 1900.
Philip, Rear-Adm'l J. W., U. S. N., June 30, 1900.
Rhea, Hortense, French actress, May 10, 1899.
Ridpath, John Clark, Am. author, July 31, 1900.
Ruskin, John, English author and art critic, Jan. 20, 1900.
Russell, Lord, of Killowen, Eng. jurist, Aug. 10, 1900.
Sarcey, Francisque, French dram. critic, May 15, 1899.
Steevens, Geo. W., English journalist and war correspondent, Jan. 9, 1900.
Steinitz, Wm., Bohemian chess player, Aug. 13, 1900.
Strauss, Johann, Austrian composer, June 3, 1899.
Vanderbilt, Cornelius, Am. millionaire, Sept. 12, 1899.
Von Caprivi, Count Georg Leo, German statesman, Feb. 6, 1899.

OBLATES (Lat., *oblatus*, offered up), the name of a class of religious bodies in the Roman Catholic Church that form a distinct order by not being bound by the solemn vows of the religious profession. The oblates were instituted by St. Charles Borromeo in the diocese of Milan at the close of the 16th century. They lived in community and were bound by a promise to the bishop to devote themselves to any service which he should consider desirable in the interest of religion. St. Charles made use of their services, chiefly in the wild and inaccessible Alpine districts of his diocese. The members consisted of secular priests and others without orders. The institute still exists and has establishments in France, England, and the United States. The chief object of the order is to assist the parochial clergy by holding missions for the religious instruction of the people in any district to which they may be invited. There is also a female institute of Oblates which was established in Rome in 1440, the Oblates of Mary Immaculate of Marseilles founded in 1815, and the Oblate Sisters of Providence founded in Baltimore, 1825. W.R.B.

OBLIGATION, DAYS OF, holidays on which faithful Catholics are bound to abstain from servile work, and hear mass. These are, for the United States, Circumcision, Epiphany, Annunciation, Ascension, Corpus Christi, Assumption, All Saints, Immaculate Conception and Christmas day. In some Western dioceses the Circumcision, Epiphany, Annunciation, and Corpus Christi are excepted.

OBLIGATION OF CONTRACTS, a phrase occurring in the constitution of the United States, out of which unexpected and the gravest consequences in jurisprudence have issued. The clause in question recites that "no state shall . . . pass any . . . law impairing the obligation of contracts." (Art. I, sec. 10, subd. 1.) At the time of framing the constitution the phrase was comparatively new, and had not the definitive sense that long adjudicated law-expressions have. However, in the different states, much trouble had arisen from laws depreciating the currency, and making it, or even property, legal tender for debts, and otherwise hindering the enforcement or modifying the effects of private engagements. Such legislation affected not only the citizens of the state making such enactments, but the citizens of other states doing business with them. In the ordinance of 1787 creating the Northwest Territory, with a view to such conduct it was provided that "no law ought ever to be made in said territory that shall in any manner whatever interfere with or conflict with private contracts, or engagements *bona fide* and without fraud previously formed." The phrase went, without serious discussion, into

the fundamental law of the land, and probably with no clearer or larger intent than to protect the sacredness of engagements between man and man from legislative encroachment. From the fact that the constitutional prohibition is imposed only on states, the inference is that Congress may enact laws of such purport within the limits of its powers. If Congress exceeds its express powers with a statute that changes the nature of a contract, such legislation would be unconstitutional. It was on this ground that Chief Justice Chase held the legal-tender clause on United States notes to be *ultra vires* of Congress.

This very simple doctrine of honest dealing received a momentous expansion in 1819, at the hands of the supreme court. The case is famous and memorable as the "Dartmouth College case." In 1815 the trustees removed President John Wheelock from his office in the college. He sued in the courts for restoration, but the legislature intervened in 1816, created a new corporation and changed the name to Dartmouth University, and Wheelock was replaced. The ousted trustees went into the state courts for possession, and were defeated. Thereupon they appealed to the United States courts, retaining Jeremiah Mason and Daniel Webster as counsel. In preparing his brief for the supreme court, Mr. Webster fortified his main argument by the novel side issue that a charter was a contract, and that the legislature of New Hampshire was forbidden by the general constitution to impair, much more to annul, its obligations. Unexpectedly, on this proposition Mr. Webster won his case. In handing down the decision of the court, Mr. Chief Justice Marshall held that the college was a private corporation, for a useful purpose; that the trustees, donors and the crown were original parties to a contract, the terms of which were the charter; that the state of New Hampshire was the successor to all the responsibilities and rights of the crown; that valuable consideration had been given on the faith of the charter; that the charter was a contract within the meaning of the constitution, and the legislature could not rescind it or change it, so long as its terms were complied with.

That this court-made law imported into the constitution a sense never contemplated by its framers will not be denied by historical students, and it profoundly modified American jurisprudence, withdrawing from sovereign states control over their own corporate creations, where any vested interests have grown up in them. This decision, too, is largely responsible for the extreme conservatism regarding property, characteristic of the United States. The principle is not known to other lands. Means have been found to meet the situation created by the Dartmouth decision. It is now well-settled law that corporations have no inferential rights, but only those expressly named in the charter; that collateral agreements with the state will not be implied; that charters may be forfeited for their violation, or for the assumption of powers not granted in them; that the right of the state to exercise police control or to preserve the community from injury cannot be alienated; that licenses do not constitute contracts inviolable by the state. Further protection is secured by making charters terminable at a given time, or by reserving in them a right to modify or repeal them.

It is also unquestioned law that the state may pass laws to regulate the exercise of contract rights, if the regulations are reasonable and for the preservation of the community, as that a railroad must not cross the highway at grade, or pass through cities at a high speed. On the other hand, while a statute is not a contract, contracts may grow up under them, as in a case where a conveyance of land is called for in the law, or taxes are remitted for a term to promote manufactures or secure a public good. The ramifications of the doctrine of "obligation of contracts" are many, affecting marriage, divorce, bankruptcy laws, procedure in enforcing contracts, etc. Under it has grown up much litigation, notwithstanding which there are obscure cases constantly arising for adjudication. See also CONTRACTS, Vol. VI, pp. 326–328; and OBLIGATION, Vol. XVII, p. 724.

O'BRIEN, CORNELIUS, clergyman, was born at New Glasgow, Prince Edward's Island, on May 4, 1843, and was educated at the College of the Propaganda at Rome. He was ordained to the priesthood of the Roman Catholic Church in 1871, and was a parish priest until 1880, when he visited Rome, and in 1882 was made archbishop of Halifax. He has built a fine church at Halifax, reorganized St. Patrick's Home, has written several books, and is conspicuous in the Imperial Federation League. W.F.J.

O'BRIEN, JOHN, an American actor, better known by his stage-name of "John T. Raymond," was born in Buffalo, New York, April 5, 1836. He made his *début* at the Rochester Theater in 1853, in *The Honeymoon*. His first tour was made with E. A. Sothern in *Our American Cousin*, he taking the part of Asa Trenchard. After playing in various other comedies, Raymond, in 1871, went to New York, where he scored the success of his life, in *The Gilded Age*. This play he made peculiarly his own, and delighted thousands with his whimsically humorous rendition of Colonel Sellers. He made a European tour in the character, but did not meet with success, and soon returned to America. He made his last appearance on the stage in Hopkinsville, Kentucky. He died in Evansville, Indiana, April 10, 1887.

OBSERVANTS, an order of friars and nuns. See FRANCISCANS, Vol. IX, pp. 615–616.

OBSERVATORY. To the very complete description of modern observatories given in the ninth edition of the ENCYCLOPÆDIA BRITANNICA, Vol. XVII, pp. 728–737, there is not much to be added. In the United States, the most important additions have been the Lick Observatory, on Mount Hamilton, California; the Observatory of Yale University, at New Haven; and the Yerkes

Observatory, at Lake Geneva, Wisconsin, erected for the use of the University of Chicago. The latter is remarkable in possessing what now is, and long may be, the greatest refracting telescope in the world. (See TELESCOPE, in these Supplements.)

The Lick Observatory, on Mount Hamilton, was completed in 1888, and under the energetic administration of Professor Holden assumed a position among the leading institutions of its kind. Its refracting telescope was the greatest in the world until the completion of the Yerkes instrument. It has been made famous by the observations of Barnard, Schaeberle, Campbell, Keeler, Tucker and others. The work of these astronomers has covered all the fields that could be cultivated with the instruments at their disposal. Here Keeler brought the art of determining by the spectroscope the motion of stars in the line of sight to a degree of perfection never reached before, and reached since only by the Astrophysical Observatory, at Potsdam.

The Yale Observatory has been devoted principally to work of the highest order in astronomical measurement, by Dr. W. L. Elkin. The most noteworthy instrument which it possesses is its heliometer, a masterpiece from the workshop of the Repsolds, and the only instrument of its kind in use in the United States. With this instrument Dr. Elkin took a prominent part in the campaign for determining the solar parallax in 1889; made a new triangulation of the Pleiades, and is now completing an investigation of the motions of the satellites of Jupiter and of the mass of that planet.

The Leander McCormick Observatory of the University of Virginia has, as its principal instrument, a 26-inch refractor, the twin brother of the Washington telescope. With this instrument Professor Stone recently made measurements of the satellites of Saturn, with the view of determining their orbits and motions.

The new Naval Observatory at Washington was completed and occupied in 1892. Since that time the work of Professor Hall with the great telescope has been continued by Professor Brown; Assistant Astronomer Skinner has observed a zone of stars for the International Astronomical Society with the transit circle, and Assistant Astronomer Hill has made observations for the variation of latitude.

At Philadelphia a small but not unimportant observatory has been erected by the University of Pennsylvania. The astronomer, Professor Doolittle, is getting it into active operation, and has decided to continue his investigations on the variation of latitude and the motion of the earth's axis.

At Albany, a new building has been erected for the Dudley Observatory, which has been supplied with an excellent telescope by Brashear. Professor Boss, in 1896, was actively engaged in getting his meridian circle at work in making new standard determinations of the positions and proper motions of certain stars. SIMON NEWCOMB

OBSTRUCTION AND OBSTRUCTIONISTS. See HOME RULE, in these Supplements.

OCALA, a city and the capital of Marion County, central eastern Florida, 35 miles S.S.E. of Gainesville, and midway between Jacksonville and Tampa, on the Florida Central, the Savannah and the Florida Southern railroads; is in the vicinity of orange groves, market gardens, cotton, sugar-cane and sweet-potato farms, and phosphate beds in working. Population 1900, 3,380.

OCAÑA, a town of the department of Santander, in Colombia, 220 miles S.E. of Cartagena; is a center of trade between Lake Maracaibo and the Magdalena region; picturesquely situated at an elevation of 3,800 feet, and in a fertile country. It was founded in sixteenth century.

OCARINA, a recent Italian instrument of flute-like sound, made of pottery, pierced with small holes and shaped like the body of a bird, without head or neck. A series of seven ocarinas are used to produce operatic melodies. The tone is soft and sweet.

OCCOM, SAMSON, an American clergyman; born in Mohegan, Conn., about 1723. He was an Indian by birth, and when 19 years old he entered the Indian school of Mr. Wheelock at Lebanon, and remained there four years. In 1748 he kept a school in New London, but shortly after removed to Montauk, L. I., where he taught and preached to the Indians. In 1766 Mr. Wheelock sent him to England as an agent for Moore's Indian charity school. Being the first Indian preacher who had visited that country, he was successful in attracting large audiences and obtaining donations. After his return to America, Occom preached at various places, passing his latter years within the bounds of the Albany presbytery. He wrote an account of the Montauk Indians, and published a sermon which he had preached on the subject of the execution of an Indian at New Haven in 1772. He died in New Stockbridge, New York, in July, 1792.

E.E.T.

OCCULTATION. See *Eclipses of the Sun and Moon*, under ASTRONOMY, Vol. II, pp. 702, 703.

OCCUPANCY, a legal term denoting one method of obtaining title to real and personal property,—a notion derived from Roman law, and supposed to originate in laws of nature, especially in those things which are open to, and therefore presumably the property of, all. Such titles to land can only arise in special cases; one of which is the accretion of land from the ocean shore, a navigable stream or a lake; another, where a defect in law provides no legal owner for a given time.

OCCUPATION, MILITARY, is the act of taking and holding possession of a city, town or other territory belonging to an enemy, by military forces. The place is generally put under martial law during the continuance of such occupation. The occupation extends to such adjoining territory as the military forces may be able to hold under actual control. The military law established over territory thus occupied suspends the local law,

but in practice only so much of it as may conflict with peaceful possession. It continues so long as the conquering power may occupy the territory or until the cessation of hostilities. The citizens of a territory occupied by a hostile power will incur no liability from recognizing the authority of the power in control, because when a government is unable to protect its citizens its claim to their allegiance is suspended.

OCEAN CURRENTS, in the Atlantic. See ATLANTIC, Vol. III, pp. 18, 19. In the Pacific. See PACIFIC OCEAN, Vol. XVIII, pp. 121–122; see also INDIAN OCEAN and NORTH SEA.

OCEAN DEPTHS. See DREDGE, Vol. VII, pp. 397–404; also PACIFIC OCEAN, Vol. XVIII, pp. 124–125.

OCEAN GROVE, a religious summer resort founded and controlled by the Methodist Episcopal Church, on the Atlantic coast, in Monmouth County, New Jersey, 33 miles south of New York, where it is reached by the New Jersey Central and Pennsylvania railroads. Established as a "camp-meeting" ground, it has been developed into a large community of hotels and cottages, in which strict Sabbatarian and other religious laws prevail, and in which during the summer innumerable religious meetings and conventions are held. The entire property is under the control of the Ocean Grove Camp-Meeting Association. Its permanent population is about 2,000, and in midsummer reaches tens of thousands. W.F.J.

OCEANICA. See POLYNESIA, Vol. XIX, pp, 431–442.

OCEAN LIFE. See DISTRIBUTION, Vol. VII, pp. 240–244.

OCHER, a native ferruginous clay, which is used as a pigment. See PIGMENTS, Vol. XIX, pp. 95, 96.

OCMULGEE, a river, a branch of the ALTAMAHA. See GEORGIA, Vol. X, p. 390.

O'CONNOR, THOMAS POWER, journalist and politician; was born at Athlone, Ireland, on October 5, 1848, and was graduated from Queen's College, Galway, in 1866. He became a reporter in Dublin, and in 1870 went to London, where he became a sub-editor of the *Daily Telegraph* and a correspondent of the New York *Herald*. Subsequently he founded and edited in London the *Star*, the *Sun*, the *Weekly Sun*, *M. A. P.* (*Mainly About People*), and *T. P.'s Weekly*. He has long been familiarly known as "T. P." In 1880 he was elected to Parliament from Galway, in 1885 from Liverpool, and has been successively re-elected ever since. He has been a leader of the Irish Nationalist movement, made a lecturing tour in its behalf in America in 1881–82, and in 1883 was made president of the Irish National League of Great Britain. In addition to his journalistic activities he has written *Lord Beaconsfield: A Biography; The Parnell Movement; Gladstone's House of Commons; Some Old Love Stories; Napoleon; The Phantom Millions*, and almost innumerable magazine and review articles. He has also edited a *Cabinet of Irish Literature*. W.F.J.

T. P. O'CONNOR.

OCONOMOWOC, a city of Waukesha County, southeastern Wisconsin, and a noted summer resort, about 30 miles W. of Milwaukee and 15 miles N.W. of Waukesha. It is the seat of a young ladies' seminary, and has a thriving local trade. It is beautifully situated on Oconomowoc Creek, and is surrounded by many charming lakes. Population, 1900, 2,880.

O'CONOR, CHARLES, an American lawyer; born in New York city, January 22, 1804. He studied law at twelve years and was admitted to the bar at the age of twenty. For many years he was recognized as one of the ablest and most brilliant members of the New York bar. Among his most celebrated cases were the Forrest divorce case; the Slave Jack case; the Lispenard will case; the Lemon slave case, and the Mme. Jumel suit. During the Civil War he was in sympathy with the South and was a strong advocate of states' rights. He was associated with William H. Evarts and Wheeler H. Peckham in the prosecution of the Tweed Ring conspirators in New York city. In 1869 he was elected president of the Law Institute of New York. In 1872 he was nominated for President of the United States by a convention at Louisville, Kentucky, composed of those Democrats who declined to indorse the Liberal Republican nomination of Horace Greeley. He died in Nantucket, Massachusetts, May 12, 1884. W.M.C.

CHARLES O'CONOR.

OCONTO, a city and the capital of Oconto County, eastern Wisconsin, on Green Bay, at the mouth of the Oconto River, and on the Chicago, St. Paul and North-Western railroads, 149 miles N. of Milwaukee. It has large steam saw-mills and exports pine lumber; has iron foundries, wagon factories and planing-mills. Population, 1890, 5,219; 1900, 5,646.

OCTANE, one of the normal paraffins. See CHEMISTRY, Vol. V, p. 483.

OCTAVE THANET. See FRENCH, ALICE, in these Supplements.

OCTOCORALLA. See ACTINOZOA, Vol. I, pp. 120, 121.

OCTOPODA, suborder of *Dibranchiata*. See MOLLUSCA, Vol. XVI, pp. 695, 696.

OCTOPUS, a genus of cephalapodous mollusks, typical of the suborder of eight-armed cuttle-fishes (*Octopoda*). The various members

of the suborder *Octopoda* are popularly known as devil-fishes. They are widely distributed, and are common near the shores of warm seas. The structural features are fully discussed in the article MOLLUSCA, Vol. XVI, p. 695.

ODD FELLOWS, INDEPENDENT ORDER OF. See BENEFIT SOCIETIES, in these Supplements.

ODENWALD. See FORESTS, Vol. IX, p. 352.

ODIC OR ODYLIC FORCE. See MAGNETISM, ANIMAL, Vol. XV, pp. 279, 280.

ODIN. See ASGARD, Vol. II, pp. 279, 280.

ODIN, a village of Marion County, south central Illinois, 64 miles E. of St. Louis, on the Illinois Central and the Baltimore and Ohio railroads; has an academy, a broom factory, a woolen-mill and a flour-mill. Population 1890, 817; 1900, 1,180.

ODLING, WILLIAM, was born Sept. 5, 1829, in Southwark, England; was educated at private schools, and, for the medical profession, at Guy's Hospital. He was graduated at the University of London in 1851, and was appointed demonstrator of chemistry at Guy's Hospital in 1850; lecturer on chemistry at St. Bartholomew's Hospital in 1863; Fullerian professor of chemistry at the Royal Institution in 1868; Waynflete professor of chemistry in the University of Oxford, June 17, 1872; and elected a fellow of Worcester College on the following day. Dr. Odling published a *Manual of Chemistry* (1861); *Lectures on Animal Chemistry* (1866); *Course of Practical Chemistry* (1876); and various scientific memoirs, especially on chemical theory.

ODOBÆNUS, same as TRICHECHUS. See MAMMALIA, Vol. XV, p. 450.

ODOMETER OR HODOMETER, an instrument employed for registering the number of revolutions of a carriage-wheel and thereby recording the distance traveled. The instrument consists of a number of cog-wheels attached to the axle of the wheel and registering the revolutions on a dial. Similar mechanisms are employed in the pedometer and cyclometer.

ODONATA, suborder of *Orthoptera*. See INSECTS, Vol. XIII, p. 158.

O'DONOVAN, DENIS, a British writer, was born in Kinsale, County Cork, Ireland, in 1836, and was educated in Ireland and France. He arrived in Queensland in 1874, and was appointed Parliamentary librarian. Mr. O'Donovan had previously filled the position of professor of modern languages in the Collège des Hautes Études, afterward in the Catholic University of Paris, and lecturer in one of the colleges of the University of France. He was one of the editors of the *Ami de la Religion*, and the author of *Memories of Rome*, and some minor works. His latest work is his *Analytical Catalogue of the Queensland Parliamentary Library*. He also published a number of lectures on art and architecture.

O'DONOVAN, WILLIAM RUDOLF, an American sculptor; born in Preston County, Va., March 28, 1844. He was self-taught in art, and after the Civil war, in which he served on the Confederate side, he established a studio in New York. He has executed many important portrait busts and bas-reliefs; statues of Washington for Caracas, Venezuela, for the Peace Monument at Newburgh, N. Y., and for the Trenton battle monument; a statue of Archbishop Hughes for St. John's College, Fordham, New York; etc.

E.E.T.

ODONTOPTERIS, a genus of fossil ferns occurring in the carboniferous rocks of various parts of Europe and many localities in the United States. Both *Odontopteris* and the closely allied *Neuropteris* had fronds of great size.

ODONTORNITHES, a group of extinct birds, whose remains are found in the cretaceous strata on the plains east of the Rocky Mountains. There are two groups of these birds, with few common characters except teeth. The *Odontotorinæ* were small birds, with bi-concave vertebræ and teeth set in sockets. The *Ichthyornis* and *Apatornis* were representatives. The birds of the second group, *Odontoholcæ*, were sometimes six feet long, with a very large tail. The wings were rudimentary and the vertebræ resembled those of existing birds. *Hesperornis* is the type of this group.

ODONTOSCOPE, an apparatus for viewing the human teeth, used by dental surgeons. It has a minute electric light and a circular dental mirror, and when inserted in the mouth enables the dentist to obtain a clear view of the teeth from all points.

ŒDEMA. See DROPSY, Vol. VII, p. 407.

ŒNOTHERA, a large genus of plants of the family *Onagraceæ*. The numerous species are known as evening primroses and are all American, especially from western and southwestern United States. They are extensively cultivated for their showy flowers. They are chiefly herbs, either leafy-stemmed or acaulescent, with regular four-parted yellow, purple or white flowers, the calyx-tube prolonged beyond the ovary, and bearing at its throat the brightly colored petals and eight stamens. *Œ. biennis* is the common yellow-flowered species of the eastern United States. By many botanists this large genus is broken up into numerous genera.

ÖREBRO, an ancient town of Sweden, at the entrance of the Svarta into the Hjelmar Lake, 170 miles W. of Stockholm. It has an ancient castle, in which many diets have been held; it is an important center for the iron trade, and has manufactories of woolens, knit goods, matches, etc. Population 1900, 22,013.

OERSTED, ANDERS SANDOE, statesman, was born in Denmark on December 21, 1778, was educated at the University of Copenhagen, was admitted to the bar in 1799, and soon rose to the foremost rank in his profession. In 1825 he was made attorney-general, and drafted many of the laws of Denmark. After the revolutions of 1830–31 he framed the constitution which the king then granted to Denmark, and thereafter he was for some years a cabinet minister. He was made prime minister in 1853, but was forced by public opposition to retire a year later. He afterward wrote some historical and political books,

and philosophical treatises. He died at Copenhagen on May 1, 1860. He was a brother of Hans Christian Oersted, q. v. W. F. J.

OERSTED, Hans Christian, a Danish physicist; born in Rudkjoebing, on the island of Langeland, August 14, 1777. He was graduated from the University of Copenhagen in 1799. In 1806 he became professor of physics there. Electro-magnetism and cognate subjects were his particular studies, and he may be said to have been the originator of the electro-magnetism theory. He was the author of *The Soul in Nature*, translated by Miss Horner, and *Manual of Mechanical Physics* (see Denmark, Vol. VII, p. 80.) He died in Copenhagen, March 9, 1851.

O'FERRALL, Charles Triplett, governor of Virginia; born Oct. 21, 1840, near Brucetown, Frederick County, Virginia; entered the Confederate army as a private and attained to the rank of colonel; graduated in law at Washington and Lee University; elected county judge, served in the legislature, in Congress for several successive terms, and since 1894 has been governor of Virginia. In the Presidential campaign of 1896, he supported the "sound-money" candidates, despite the opposition of the Virginia press.

OGDEN, a city of Utah. This city is the location of machine and repair shops of the Central Pacific, and of iron-works, shops for producing mining-machinery and farm-implements, planing, woolen, saw and flour mills, furniture, confectionery, sash, baking-powder, cornice, brick and cigar factories, fruit canning, electric-light and broom factories, together with two breweries. It is the seat of Utah University, the construction of which, at a cost of $500,000, was begun in 1890. The institution is of the Methodist Episcopal denomination. There are here Ogden Academy (Congregational), a military academy, 12 public schools, 1 state and 3 national banks, and 1 loan and trust company. Ogden has a Mormon Tabernacle, an opera-house, and six hotels, one of which was erected at a cost of $150,000. On account of its evenness of climate the city is a favorite health-resort, the waters of the famous hot springs being especially efficacious in certain forms of scrofula, rheumatism and other diseases. Population 1890, 14,889; 1900, 16,313. See Ogden, Vol. XVII, p. 753.

OGDEN, Aaron, an American statesman; born in Elizabethtown, N. J., Dec. 3, 1756. He graduated at the College of New Jersey (now Princeton University) in 1773. In 1777 he entered the army and served with distinction throughout the whole Revolutionary war, notably in the battles of Brandywine, Monmouth, and Springfield, the Virginia campaign of 1781, and the siege of Yorktown. He then studied law, was admitted to the bar, and commenced practice. He was a Presidential elector in 1800, and was appointed one of the commissioners for adjusting the disputed boundary between the States of New York and New Jersey. In 1800 also he was elected to the United States Senate from New Jersey, to succeed James Schureman, resigned, and served from March 3, 1801, to March 3, 1803. He resumed the practice of law till 1812, in which year he filled the gubernatorial chair of New Jersey, returning again to the practice of his profession until his death. Toward the close of his life he was involved in litigation with Robert Fulton over questions of monopoly in steamboat navigation which were then rife. He was president-general of the Society of the Cincinnati at the time of his death, which took place in Jersey City, N. J., April 19, 1839. E. E. T.

OGDEN, Robert Curtis, merchant and philanthropist, was born in Philadelphia on June 20, 1836. Since 1885 he has been a member of the mercantile house of John Wanamaker in Philadelphia and New York. He is an officer of Hampton Institute, Union Theological Seminary, Tuskegee Institute, and the Southern Education Board. W. F. J.

OGDEN, William Butler, pioneer and railroad president, was born at Walton, N. Y., on June 15, 1805, settled in Chicago in 1835, was its first mayor in 1837, was first president of the Union Pacific railroad, and was identified with the Rush Medical College, the University of Chicago, and other institutions. He died on August 3, 1877. W. F. J.

OGDENSBURG, a port of entry in St. Lawrence County, New York. It is the headquarters of the Northern Transportation Company, a line of steamers plying between Chicago and intermediate points on the lakes, and annually carrying a large amount of grain and lumber, besides general lake and river freight. The city has also several fine public parks. The St. Lawrence River at this point is over two miles wide. Population 1890, 11,662; 1900, 12,633. See Ogdensburg, Vol. XVII, p. 753.

OGLESBY, Richard James, an American soldier and statesman; born in Oldham County, Ky., July 25, 1824. He removed to Decatur, Ill., in 1836. Here he received a limited education, became a carpenter, studied law, and began practice in 1845. He served in the army during the Mexican war, and next spent two years in mining in California. Returning to Illinois in 1851, he resumed the practice of law, and in 1860 was elected State senator, but served for only one session, resigning to enter the Union army as colonel of the 8th Illinois Volunteers. He was desperately wounded at Corinth, was promoted brigadier-general, and in 1863 became major-general. He resigned in 1864, and was elected governor of Illinois, serving from 1864 to 1869. He was again elected governor in 1872, but resigned the gubernatorial chair in 1873 to enter the United

RICHARD J. OGLESBY.

States Senate, in which he sat from January 13, 1873, to March 3, 1879. He was re-elected governor in 1885, and died in Elkhart, Ill., April 24, 1899. E.E.T.

O'HARA, THEODORE, soldier and poet, was born at Danville, Ky., on February 11, 1822, and was graduated from St. Joseph's College. He became a teacher, a lawyer, and an employe in the U. S. Treasury. He was in the Mexican War, in Lopez's Cuban and Walker's Nicaraguan expeditions, edited several papers in the South, and was a Confederate officer in the Civil War. He wrote the poem entitled *The Bivouac of the Dead*, which is known the world around. He died on June 6, 1867. W.F.J.

OHIO had a population in 1900 of 4,157,545, a gain of 485,229 over 1890. From 1840 to

STATE SEAL OF OHIO.

the taking of the census of 1890 Ohio had occupied the third place in rank of population, but the eleventh census placed it fourth, and after Illinois. The number of inhabitants (1900) was 102.0 to the square mile, a greater destiny than that of any other of the states of the north central division, the average of which was only 20.68. The cities of Ohio having a population of 8,000 or more numbered 38, in which resided 1,599,840 inhabitants, making the urban population 38.5 per cent of the state. The male inhabitants numbered 2,102,655, the female 2,054,890, a more equal division of the sexes than in any other state of the group to which Ohio belongs. The percentage of native-born citizens was 89.0, of foreign-born 11.0. The number of negroes was 96,901, an increase since 1890 of 9,788. The population also included 371 Chinese, 27 Japanese and 42 civilized Indians.

Ohio has been near the center of population of the United States since 1830. In that year the center was in the neighboring state of West Virginia; in 1860 it was in the southern part of Ohio, twenty miles from Chillicothe, the first capital. In 1870 it had shifted to a point 48 miles N.E. of Cincinnati; in 1880 it was eight miles S.W. of that city; in 1890 it had moved slightly to the northwest, still within forty miles of Cincinnati.

The gross area of Ohio is 41,060 square miles, of which 300 is water surface, leaving 40,760 square miles, or 26,086,400 acres of land surface.

Almost ninety per cent of this land surface is under cultivation in Ohio, and all branches of agriculture receive attention. Fruit-raising is a large industry, and the state is famed for its apples, peaches, plums and grapes.

The production of the cereals in Ohio in 1889 is shown in the accompanying table, the percentages being that of the entire crop of the United States:

PRODUCT.	ACRES.	PER CENT.	RANK	BUSHELS.	PER CENT.	RANK
All cereals	6,785,280	4.84	7th	191,818,162	5.45	6th
Corn	3,189,553	4.42	7th	113,892,318	5.37	6th
Wheat	2,269,585	6.76	5th	35,559,208	7.59	5th
Oats	1,215,355	4.29	10th	40,136,732	4.96	7th
Barley	37,092	1.15	13th	1,059,915	1.35	11th
Rye	59,643	2.75	12th	1,007,156	3.54	10th
Buckwheat	14,052	1.68	9th	162,833	1.34	9th

The increase in the acreage of oats since 1879 was 304,967, and the average yield recorded for 1889 was 33+ bushels per acre. The yield of barley for the year mentioned was 28+ bushels to the acre, which was greater than the average either for the United States or for the north central group. In rye, the acreage of 1889 was more than double that of 1879, the average yield more than sixteen bushels per acre, while the average yield for the United States was 13.09 bushels per acre. The first statistics of the flax crop were gathered in 1849, at which time Ohio was one of three states producing 57.38 per cent of the entire seed product, and individually producing more than two and one half times as much as any other state. Between 1879 and 1889 Ohio fell off 85.10 per cent in the production of fiber and 75.46 per cent in the production of seed. In rank, Ohio, which had produced more flax during fifty years than any other state, occupied the eighth place, following close behind the states of the far West. In the production of hemp, in 1889 Ohio stood fifth in acreage, sixth in amount produced, eighth in average yield per acre, sixth in total value of product and second in average value per ton. In tobacco, Ohio increased the acreage planted in 1889 over the area in 1879 by 9,627 acres. The rank among the states was fifth, the number of acres 44,303; the percentage of total area 6.37; the rank in production was third; the production in pounds was 37,853,563 and the percentage of the entire product of the United States was 7.75.

The following additional agricultural items are from the census report of 1900:

Pounds of maple sugar produced	613,990
Gallons of maple molasses made	923,519
Gallons of sorghum molasses made	341,523
Acres of meadow-land mown for hay	3,015,261
Tons of hay produced	4,192,871
Bushels of clover-seed produced	336,318
Bushels of other grass-seed produced	52,403
Acres of Irish potatoes	167,590
Bushels of Irish potatoes produced	13,709,238
Acres of sweet potatoes	3,796
Bushels of sweet potatoes produced	249,767
Acres of broom-corn	802
Pounds of broom-corn produced	537,160
Acres of tobacco	71,422
Pounds of tobacco produced	65,957,100

The number of farms in Ohio in 1900 was greater than that of any other state of the Union the aggregate being 276,719

TABLE SHOWING THE RELATIVE SIZE OF THE FARMS.

Under 10 acres	17,347
10 acres and under 20 acres	18,115
20 acres and under 50 acres	57,566
50 acres and under 100 acres	89,774
100 acres and under 500 acres	92,837
500 acres and under 1,000 acres	916
1,000 acres and over	164
Average size of farms, acres	88.5

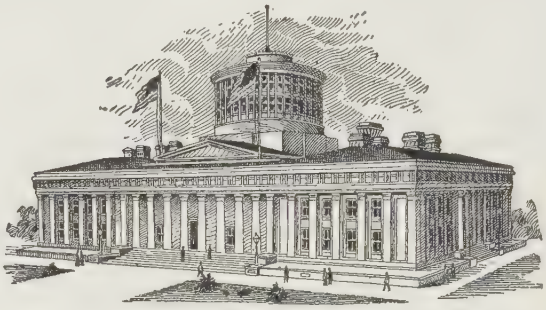
Of these, 200,788, or 72.5 per cent, were cultivated by the owners; 24,051, or 8.7 per cent, were rented for money; 51,880, or 18.8 per cent, were rented on shares.

The aggregate acreage of the farms of the state by the census of 1900 was 24,501,985, of which area almost eighty per cent was improved. The total value of the lands, fences, buildings, farm implements and machinery and live-stock was given as $1,198,923,946; the estimated value of the farm products of 1899 was $257,065,826; the number of horses was 878,205; mules and asses, 17,021; neat cattle, 2,053,313; swine, 3,188,563; and sheep, 2,648,250, whose wool clipped the season previous amounted to 20,350,721 pounds. In sheep, Ohio stood second only to Texas, although a decrease had taken place, since 1880, of 2,053,313 head. In 1890, Ohio reported the largest number of sheep to the square mile of land surface of any state. The weight of fleeces had been increased from 5.10 pounds to 5.70 pounds per sheep, the majority of which were merinos or grade merinos. In 1889 more than 250,000 head of swine died of disease in Ohio; the total number of swine in the state was 100,000 in excess of that of 1879. The number of neat cattle on farms was between forty and fifty to the square mile. Ohio had the highest percentage of pure-bred cattle of any of the north central states, and was second in the annual production of milk per cow, the average in Ohio being 411.31 gallons. In 1889 Ohio and Iowa were the only states reporting over one million pounds of cheese made on farms.

The report of the Ohio State Board of Agriculture for 1900 gives the following statistics relative to the crops of the preceding year:

	ACRES.	BUSHELS.
Wheat	3,209,074	50,376,800
Corn	3,826,013	152,055,390
Oats	1,115,149	42,050,910
Barley	34,058	1,053,240
Rye	17,583	257,120

In the production of minerals Ohio stood fifth among the states, the total value of the output of 1889 amounting to $26,653,439. In the item of iron ore, 70 mines were reported as producing 254,294 long tons, of the value of $532,725. Coal-mines to the number of 2,068 reported an output of 9,976,787 tons, of the value of $9,355,400. The number of employees was 19,591, the wages paid amounted to $6,892,604, all expenditures reached the sum of $8,232,183, and the capital invested was given as $14,018,236. The output of crude petroleum amounted to 12,471,466 barrels, of the total value of $2,173,995. Illuminating oil to the amount of 317,037 barrels was refined, the value being $340,683. Lubricating oil to the amount of 1,240 barrels returned $10,334, and fuel oil yielded 12,153,189 gallons of the value of $1,822,978. The number of petroleum wells was 2,640, of which 785 were flowing wells and 1,855 required pumping. The



CAPITOL BUILDING, COLUMBUS.

aggregate capital invested (1900) in petroleum oil within the state reached the sum of $10,912,818; the number of employees was 1,008 and the wages paid amounted to $551,692. The value of paper and wood pulp produced during the year was given as $6,543,513; the capital invested, $7,872,913; the number of employees, 3,184; the wages paid, $1,118,040, and the expenses for material, $3,768,572.

In the production of useful stone, Ohio ranks second, the number of quarries being 413 and the value of the product $4,361,590; limestone, valued at $1,514,934; sandstone, at $3,046,656. Other mineral products are grindstones, gypsum, metallic paint and mineral waters. The reported value of the salt produced in 1900 was $818,200.

The fisheries of the state in 1889 had 2,012 persons engaged, the capital invested was $1,328,428, and the value of the product was $746,396.

The census reports of 1900 give the number of specified manufacturing industries as 32,398, in which $605,792,266 were invested; 375,872 employees engaged, $183,306,375 paid in wages; and finished products valued at $832,438,113 were turned out. The principal industry was that of iron and steel, which yielded a return of $138,935,256. Twenty-six other industries yielded products valued at from $72,399,632 for foundry and machine-shop products, down to electrical apparatus, etc., which amounted to $6,504,847. Among other industries named as producing more than $8,000,000 were flouring and grist mills, factories, carriages and wagons, malt liquors, refined petroleum, lumber and other wood-working mills, agricultural implements, tobacco, and slaughtering and meat-packing.

The commissioner of common schools of Ohio makes the following report for the year 1895:

Number of districts	11,230
Number of teachers employed	25,004
Number of women teachers	14,738
Number of men teachers	10,266
Number of children, 6 to 21 years	1,159,258
Number of pupils enrolled in schools	817,490

Daily attendance	593,465
Number of schoolhouses	13,039
Value of schoolhouses and grounds	$38,925,896
Available for expenditure	$18,887,597
Amount expended	$13,805,105
Amount paid teachers	$ 7,907,860
Number of teachers' institutes held	88
Continuing in days	567
Attendance at institutes	20,013
Expended for institutes	$ 26,486

TABLE OF THE DENOMINATIONAL INSTITUTIONS OF OHIO FOR HIGHER EDUCATION.

LOCATION.	INSTITUTION.	RELIGIOUS DENOMINATION.
Akron	Buchtel College	Universalist.
Alliance	Mount Union Coll.	Methodist Epis.
Berea	Baldwin Univ.	Methodist Epis.
Berea	Ger. Wallace Coll.	Methodist Epis.
Cincinnati	Bartholomew Sch.*	Protestant Epis.
Cincinnati	St. Joseph's College.	Roman Catholic.
Cincinnati	St. Xavier's College.	Roman Catholic.
Cleveland	Calvin College	Reformed.
Cleveland	St. Ignatius College.	Roman Catholic.
Columbus	Capital University	Lutheran.
Delaware	Ohio Wesleyan Univ.	Methodist Epis.
Findlay	Findlay College	Church of God.
Gambier	Kenyon College	Protestant Epis.
Glendale	Female College	———
Granville	Denison Univ.	Baptist.
Granville	Female College*	Presbyterian.
Granville	Shepardson Coll.	Baptist.
Hillsboro	Hillsboro College	Methodist Epis.
Hiram	Hiram College	Christian.
Lima	Lima College	Lutheran.
New Concord	Muskingum College.	United Pres.
Oxford	Oxford College	Presbyterian.
Rio Grande	Rio Grande College	Free Baptist.
Scio	Scio College	Methodist Epis.
Springfield	Wittenberg College	Lutheran.
Tiffin	Heidelberg Univ.	Reformed.
Urbana	Urbana University	N. Church.
W. Farmington.	Farmington College.	Methodist Epis.
Westerville	Otterbein Univ.	United Brethren.
Wilberforce	Wilberforce Univ.	African Meth. Epis.
Wilmington	Wilmington College.	Friends.
Wooster	Univ. of Wooster	Presbyterian.

TABLE OF NON-SECTARIAN INSTITUTIONS OF OHIO.

LOCATION.	INSTITUTION.
Athens	Ohio University.
Bainsville*	Lake Erie Seminary.
Cincinnati	University of Cincinnati.
Cleveland	Western Reserve University.
Columbus	Ohio State University.
Defiance	Defiance College.
Germantown	Twin Valley College.
Hopedale	Hopedale Normal College.
Marietta	Marietta College.
New Athens	Franklin College.
Oberlin	Oberlin College.
Oxford	Miami University.
Richmond	Richmond College.
Yellow Springs	Antioch College.

In 1890 there were in Ohio 9,345 church organizations, 8,857 edifices, a membership of 1,215,409, which was 33.10 per cent of the population, and church property of the value of $42,138,862. Forty-nine denominations and 5 independent organizations were enumerated; the leading ones are: Baptists (all bodies) 846, Roman Catholics 586, Christians 273, Christian Union 103, Congregationalists 247, Disciples of Christ 475, Dunkards 153, Evangelical Association 216, Friends 131, German Evangelical Synod 107, all Lutherans 588, all Methodists 2,798, all Presbyterians 828, Protestant Episcopal 169, Reformed 299, and United Brethren 995.

* Exclusively for girls.

On Jan. 1, 1899, there were 1,193 newspapers published in Ohio, one or more in all of the 88 counties, and in 404 cities, towns, and villages of the state, of which 88 were county seats. Of the whole number of papers, 162 were dailies, 7 triweekly, 51 semiweekly, 811 weekly, 4 fortnightly, 15 semimonthly, 126 monthly, 1 bimonthly, and 16 quarterly.

The report of the state treasurer shows that the total receipts from all sources for the fiscal year 1900 amounted to the sum of $5,222,355, which included a balance of $802,264 carried over from 1899. The expenditures of the year were $4,909,453, leaving a balance at the close of 1899 of $312,902. The total state debt, Jan. 1, 1898, was $1,241,665, all of which will be extinguished July 1, 1900. Within the period from 1892 to 1896 more than $1,500,000 of the funded debt of the state was paid.

The value of all taxable real estate and personal property in Ohio, according to the consolidated tax duplicate of 1895, was as follows:

Real estate in cities and villages	$ 625,179,132
Real estate not in cities and villages	589,748,953
Chattel property	527,589,429
Total	$1,742,517,514

The taxes for 1896 were as follows:

For state purposes ($2\frac{75}{100}$ mills)	$ 4,790,054
For county purposes	9,986,407
Township, city, school and special taxes	25,747,573
	$40,524,035
Minor sources of revenue	4,087,255
Total	$44,611,290

TABLE OF STATE PUBLIC INSTITUTIONS, THEIR LOCATION, COST OF MAINTENANCE, AND AVERAGE NUMBER OF INMATES FOR 1895.

INSTITUTION.	LOCATION.	NO. INMATES.	MAINTENANCE.
Athens State Hospital (a)	Athens	828	$134,594
Columbus State Hosp. (a)	Columbus	1,149	184,656
Dayton State Hosp. (a)	Dayton	792	136,385
Cleveland State Hosp. (a)	Cleveland	929	143,923
Massillon State Hosp. (a)	Massillon	----	64,446b
Toledo State Hosp. (a)	Toledo	1,183	180,598
Ohio Hosp. for Epileptics	Gallipolis	351	142,288
Longview Asy. for Ins. (c)	Longview	750	128,398
Ohio Institution for Feeble-minded Youth	Columbus	952	148,651
Girls' Industrial Home	Delaware	340	41,204
Ohio Inst. for the Blind	Columbus	230	64,584
Ohio Working Home for the Blind	Iberia	60	8,831
Institution for the Deaf and Dumb	Columbus	456	97,843
Ohio State Reformatory	Mansfield	----	50,000d
Ohio Soldiers' and Sailors' Home	Sandusky	1,257	171,419
Ohio Penitentiary	Columbus	2,020	387,733

(a) For the insane.
(b) In course of erection.
(c) Partially supported by city of Cincinnati.
(d) Not completed for occupancy.

The report of the commissioner of railroads and telegraphs, made in 1895, gives the following facts:

Railroad corporations in the state	84
Miles of track in the state	12,596
Miles not of standard gauge	200
Miles steel-rail track	11,123
Mileage and equipment investment	$560,250,961
An average per mile of	$65,739
Earnings in 1894 in Ohio	$ 60,140,831
Decrease from 1893	$ 22,982,910
Operating expenses for 1894, in Ohio	$ 43,230,655
Decrease from 1893	$ 10,291,881
Persons employed during the year	54,733
Amount of salaries	$ 30,546,709
Passengers carried during the year	27,231,220
Tons of freight hauled	59,639,559
Telegraph companies doing business in Ohio	6
Miles of line in operation	53,353
Capital stock, aggregate	$103,440,625

In 1895 the state of Ohio appropriated $133,415 for the support and maintenance of the National Guard, which had a total strength of 6,039 officers and enlisted men. There were 102 companies of infantry, 8 batteries of artillery and 2 troops of cavalry. There were 8 full regiments of infantry, a battalion of 3 companies of negroes, an unattached company of infantry mounted on bicycles. During the preceding year there had been many calls on the Guard of the state, and the expenses attendant on these special calls approximated $143,000. The Federal appropriation for the Guard was about $20,000.

The following is a list of the principal cities and towns of Ohio, with the populations as given in the census reports of 1900: Cincinnati, 325,902; Cleveland, 381,768; Columbus, 125,560; Toledo, 131,822; Dayton, 85,333; Youngstown, 44,885; Springfield, 38,253; Akron, 42,728; Canton, 30,667; Zanesville, 23,538; Findlay, 17,613; Sandusky, 19,664; Hamilton, 23,914; Lima, 21,723; Newark, 18,157; Mansfield, 17,640; Steubenville, 14,349; Portsmouth, 17,870; Chillicothe, 12,976; East Liverpool, 16,485; Ironton, 11,868; Tiffin, 10,989; Massillon, 11,944. In addition to these there were 47 cities and towns having a population less than 10,000 and more than 4,000.

State flower, Scarlet Carnation or Golden Rod.

List of the governors of Ohio, beginning with the first governor after admission of the state into the Union in 1802: Edward Tiffin, 1803–07; Thomas Kirker, 1807–08; Samuel Huntington, 1808–10; Return Jonathan Meigs, 1810–14; Othniel Looker, 1814; Thomas Worthington, 1814–16; Ethan Allen Brown, 1816–22; Allen Trimble, 1822; Jeremiah Morrow, 1822–26; Allen Trimble, 1826–30; Duncan McArthur, 1830–32; Robert Lucas, 1832–36; Joseph Vance, 1836–38; Wilson Shannon, 1838–40; Thomas Corwin, 1840–42; Wilson Shannon, 1842–44; Thomas W. Bartley, 1844; Mordecai Bartley, 1844–46; William Bebb, 1846–49; Seabury Ford, 1849–50; Reuben Wood, 1850–53; William Medill, 1853–56; Salmon P. Chase, 1856–60; William Dennison, 1860–62; David Tod, 1862–64; John Brough, 1864–65; Charles Anderson, 1865–66; Jacob Dolson Cox, 1866–68; Rutherford B. Hayes, 1868–72; Edward F Noyes, 1872–74; William Allen, 1874–76; Rutherford B. Hayes, 1876–78; Richard M. Bishop, 1878–80; Charles Foster, 1880–84; George Hoadley, 1884–86; Joseph B. Foraker, 1886–90; James E. Campbell, 1890–92; William McKinley, Jr., 1892–96; Asa S. Bushnell, 1896–1900; George K. Nash, 1900–04; Myron T. Herrick, 1904–.

OHIO RIVER, the largest eastern tributary of the Mississippi, which river it joins at Cairo, about 1,200 miles from the Gulf of Mexico, after following a west-southwesterly course of 975 miles from Pittsburg, where it is formed by the junction of the Allegheny and the Monongahela. After leaving the state of Pennsylvania, through the western part of which it flows, it forms the boundary between Ohio, Indiana and Illinois on the right and West Virginia and Kentucky on the left. Its chief tributaries are the Muskingum, Scioto, Miami and Wabash on the north and the Great Kanawha, Big Sandy, Licking, Kentucky, Green, Cumberland and Tennessee on the south. The area of the region drained by the Ohio has been variously estimated at from 202,000 to 214,000 square miles, and the volume of water discharged into the Mississippi, 158,000 cubic feet per second, is greater than that carried by the Missouri, which is but 120,000 cubic feet.

There are no rapids of importance in the river, except those at Louisville, which are avoided by means of a canal, and navigation is carried on from Pittsburg to the Mississippi on flat-bottomed steamboats during all of the year but a few weeks in the summer, when the water becomes so low that the river is fordable at many points above Cincinnati. The river shows great variations in level, the difference between low water and the high water during the freshets of the spring and early summer being fifty and sometimes sixty feet. Of the numerous islands in the course of the Ohio, some are fertile and others are mere sand-bars, known as "tow-heads." The river varies in width from 500 to 1,400 yards, and is spanned by bridges at Wheeling and Cincinnati.

The chief cities on its banks are Pittsburg, Wheeling, Portsmouth, Cincinnati, Covington, Newport, Louisville, Madison, New Albany, Evansville and Cairo.

OHIO STATE UNIVERSITY, an institution for the higher education of both sexes, maintained and controlled by the state of Ohio; located at Columbus. In 1862 Congress granted each state a certain acreage of land out of the public domain, the receipts from the sale of which were to be used in endowing a state institution of higher learning. Ohio accepted this grant, but did not organize a university until 1872, when the present institution was established and given a campus of about 340 acres in what is now the heart of Columbus. Liberal annual appropriations for its support have been made by the state legislature. Complete scientific laboratories have been equipped, and a library of 50,000 volumes in 1904 had been collected. The agricultural and industrial instruction, in some states separated from the collegiate courses, is carried on in Ohio at the State University. In

addition to these and the collegiate courses, instruction is given in pharmacy, engineering, law, and veterinary medicine. In 1904 there were 145

OHIO STATE UNIVERSITY.

in the faculty and 1,827 students. Inclusive of the class of 1901, 1,239 had graduated. The endowment of the institution was valued at $550,469, and the annual income in 1901 was $337,401. The annual tuition fee is $15.

OHIO UNIVERSITY, a co-educational, non-sectarian institution, located at Athens, Ohio. Provision was made in 1787 by the Ohio Company, in its purchase contract with the United States government, for an institution of learning, which was to be maintained by the legislature of the new state. In 1804 the Ohio University was established at Athens in compliance with the terms of this contract. Annual appropriations have been made to the institution by the state legislature, liberal at first but small of late. The first class was graduated in 1815. In 1904, 582 had been graduated. There were 43 in the faculty and 833 students. The school possessed in 1904 a library of 18,500 volumes. The productive funds in 1904 amounted to $137,000, and the annual income was $169,067. The institution is governed by a board of trustees, who are appointed by the governor of the state.

OHIO WESLEYAN UNIVERSITY, a co-educational institution, located at Delaware, Ohio. It is maintained and governed by the Methodist Episcopal Church, and was established in 1844. In addition to the regular collegiate courses, instruction is given in music, art, and commercial studies. It has an endowment estimated, in 1898, at $686,026, and that year its income was $66,701. In 1904 there were 165 in the faculty, 1,221 students in attendance, 43,000 volumes in the library, and 4,413 had been graduated.

OHM'S LAW. See ELECTRICITY, Vol. VIII, pp. 38–41; and ELECTRICITY, § 110, in these Supplements.

OHNET, GEORGES, a French novelist; born in Paris, April 3, 1848. He entered the journalistic field immediately after the close of the war of 1870, and was on the staff of the *Constitutionnel* and *Le Pays*. He wrote a drama, *Regina Sarpi*, in conjunction with Denayrouze, and a second, of which he was the sole author, *Marthe*, in 1877. He published *Battles of Life*, a collection of romances, and followed it with a number of novels and dramas. Among his later novels are *Le Doctor Rameau* (1889); and *Dette de Haine; Les Dames de Croix Mort* (1886); *Volonté* (1888); (1891); *Le Maitre des Forges* ("The Ironmaster") and *La Grande Marnière* were two of his dramas, among many, that had exceptional successes.

OIL CITY, a city of Venango County, western Pennsylvania, 13 miles N.E. of Tionesta, and 8 miles E.N.E. of Franklin, on the Allegheny River and the Allegheny Valley railroad. It is the principal oil market in the Pennsylvania petroleum region; contains several large oil refineries, pipe-works, iron foundries, engine and boiler works, and railroad shops; has a city hospital, a public library, and an oil exchange. A point of interest is Clark's Summit, within two miles of the city. Population 1890, 10,932; 1900, 13,264.

OIL RIVERS, West Africa, a deltaic region of British Southern Nigeria, extending between the Bights of Benin and Biafra in the Gulf of Guinea. It is formed by the Niger River and its numerous outlets, through which enormous quantities of palm oil (hence the name) and other tropical products are brought from the interior to the various shipping ports along the coast, chief of which is Akasa at the principal mouth of the Niger. The first official name, the Oil Rivers Protectorate, was changed to Niger Coast Protectorate, and now has no political significance except as a colloquial designation. C.L.S.

OIL-TESTERS. Numerous forms of testers have been devised for ascertaining the flashing-point of petroleum oils designed for illumination, etc. Various tests have been legalized or prescribed by different states and governments. The Abel tester was the first to come into general use. This apparatus has been improved and modified by various inventors, Braun of Berlin applying a magnetic-pendulum arrangement for applying the test-flame; Engler and Hass, a stirrer for the oil-cup; and several have made use of the electric spark to fire the vapor. The Pensky and Pensky-Martens testers are used to determine the flashing-point of lubricating oils. A description of the Gray tester, a recent form for the same purpose, will serve pretty nearly for other makes as used for heavy oils generally. A brass oil-cup, about two inches in diameter, and of the same depth, stands on a tripod. It has a tight-fitting lid, through which is a steel shaft, the latter bearing within the cup two stirrers, one for oil, the other for vapor. The shaft is rotated by means of bevel wheels and a hand crank. The lid has three holes, and in the sliding cover are two more holes, which may be brought into correspondence with the two in the lid. By drawing back the shaft the openings may be uncovered, and the test-flame applied. A gas-flame or a lamp commonly is used for heating the oil-cup to the desired temperature.

OIL WELLS. See PETROLEUM, Vol. XVIII, pp. 729, 730.

OJEDA, ALFONSO DE, a Spanish explorer; born

in 1465 in Cuenca; Ojeda was one of the numerous adventurers who took part in the Spanish exploring expeditions which followed Columbus's discovery of America. He was with Columbus on the second voyage, and gave Venezuela its name, in 1499, while on an independent voyage. He was regarded as one of the greatest adventurers of his time, and Cortes, Pizzarro and Americo Vespucci were with him in some of his expeditions. He suffered hardships, was imprisoned, and died in great poverty in Santo Domingo, West Indies, in 1515.

OJIBWAS OR CHIPPEWAS, branch of Algonquin family. See INDIANS, Vol. XII, pp. 867–871.

OKA, a Russian river. See VOLGA, XXIV, 299.

OKAPI, an animal, known to the natives of central Africa by that name, and discovered at the end of the nineteenth century by the British governor, Sir Harry Johnston, in the forests of Uganda. Its hips and legs indicated, at first, a kinship to the zebra, but it was soon proved to be a ruminant instead of an equine. In the absence of any distinct classification, it was assumed to be a connecting link between giraffes and horned cattle. Some zoölogists have discovered a striking resemblance of the Okapi to the god Set found on Egyptian sculpture, which has led to the presumption that it may be a descendant of a species of animal imaged on stone more than 5,000 years ago, then had vanished from the ken, the memory and traditions of the civilized world.

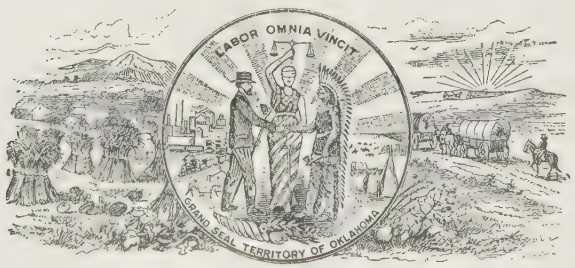
OKAYAMA, Japan, a prefectoral town in the S. W. of Hondo, the central island, on a bay of the Inland Sea, 75 miles by rail west of Kobe. Population, 1898, 58,025. C.L.S.

OKECHOBEE LAKE, the largest lake in the southern part of the United States, situated in southern Florida; is partly included in Brevard and Dade Counties; is about forty miles long and 25 miles wide; its greatest depth is about twenty feet. The shores of the lake are mostly swampy, and the lake itself almost inaccessible.

OKEFENOKEE SWAMP is a vast swamp lying in the southeastern part of Georgia, and extending into Florida. It occupies most of Charlton County, Georgia, contains three lakes, is partly drained at the south by the St. Mary's River, and is heavily timbered. W.F.J.

OKHOTSK, SEA OF. See SIBERIA, XXII, p. 10.

OKLAHOMA, one of the territories of the United States, organized May 2, 1890, is bounded



TERRITORIAL SEAL OF OKLAHOMA.

on the north by Kansas and Colorado, on the east by Indian Territory, on the south by Texas and Indian Territory, and on the west by Texas and New Mexico. The area is 39,030 square miles, of which 200 square miles is water surface and 38,830 square miles land surface. Oklahoma lies within the boundaries of the Louisiana Purchase of 1803, and was carved out of Indian Territory, to which was added "No Man's Land," a strip 170 miles long and 35 miles wide, lying between Texas on the south and Kansas and Colorado on the north, and so called because not included in any state or organized territory. This strip, with 5,439,865 acres in Indian Territory, purchased from the Creeks and Seminoles in 1889 for $4,193,799, was thrown open to settlement by proclamation of the President, April 22, 1889. More than 50,000 persons entered on the first day to occupy the land. For almost a year the people were without an organized government, but early in 1890 the territory of Oklahoma was created. The section of country known as the Cherokee Strip was to be added to it when the title of the Indians should be extinguished. In 1891 almost 300,000 acres of land, formerly belonging to the Sac and Fox, Pottawatomie, Shawnee, Cheyenne and Arapahoe Indians, were thrown open to settlement; and in 1893 the Cherokee Strip of 6,000,000 acres was also opened. Some 90,000 people entered the Strip on the day named by the President, and much suffering ensued from lack of water and provisions.

The census reports of 1900 gave the population of the territory at 398,331, Wyoming, Arizona and Nevada, in the order named, standing below it. The number of males was 214,359; the number of females, 183,972, the percentage of native-born population was 96.1; the number of negroes, 18,831; of Chinese, 31; and of civilized Indians, 6,018.

In 1892 the population was reported by the governor at 133,100, the count having been made by a commission appointed by Congress. In 1893 the number of inhabitants was estimated at 151,213, and the residents of the Cherokee Strip numbered an additional 100,000. In 1894 the returns of the assessors showed a population of 212,635; on June 30, 1895, the total number of inhabitants was given by the Interior Department as 275,000; and in 1898 as 311,400.

The soil and products of Oklahoma Territory are very similar to those on similar meridians in Kansas and Texas, and the latter include almost every crop grown in the United States. The cereals thrive and grasses grow luxuriantly. Grapes and apples are well adapted to the uplands and fruits of all kinds are yielded abundantly.

The following statistics appear in the twelfth decennial census:

Number of farms	62,495
Acreage in farms	15,719,258
Improved land in farms, acres	5,511,994
Unimproved land in farms, acres	10,207,264
Valuation of land, fences, buildings, farm implements and machinery, and live-stock	$185,343,818
Horses	303,631
Mules and asses	57,198
Neat cattle	1,709,752
Swine	584,878
Sheep	48,535

With the increase in population came increased activity in all agricultural pursuits. In 1900 the following statistics were given out for 1899:

	Acres.
Corn	1,320,506
Wheat	1,279,826
Oats	156,619
Cotton	240,678
Sorghum cane	9,788
Broom-corn	12,366
Hay and forage	695,313
Potatoes	7,677
Castor beans	13,997
Total farm acreage	3,736,770

From 1890 to 1900 horses had increased 278,077; mules, 52,275; sheep, 31,970; swine, 562,916; and the number of milch cows was 149,096, and other cattle, 1,433,701.

In 1900 the value of the cotton crop was $2,217,119.

In 1900 Oklahoma had 870 manufacturing industries, in which $3,352,064 was invested, 2,054 hands employed, whose annual wages amounted to $807,826, and which turned out finished products to the value of $7,083,938. The leading industry was flouring and grist milling, whose total products for 1900 amounted to $3,745,434, followed by printing and publishing newspapers and periodicals, returning a total of $481,663.

In 1900 there were four lines of railway, operating 900 miles of road. The total valuation of the property assessed was $4,011,092.

The number of banks in the territory in 1900 was ninety-seven, with capital aggregating $1,572,000, $200,000 surplus and undivided profits, deposits of near $6,500,000, loans and discounts almost $4,000,000.

Coal, both anthracite and bituminous, petroleum, limestone, gypsum, sandstone, and fire and brick clay are found in many parts of the territory, and in 1895 gold was discovered in the Wichita Mountains.

The report of the territorial auditor gives the amount collected for the two years 1894–95 as $192,727; disbursements within the same period, $185,142. The taxable property, as equalized for assessment, was given in 1901 at $60,464,696, an increase of over $11,000,000 during 1900.

Educational reports for 1901 show the enrollment in the public schools of the territory to have been 87,635. The total apportionment for the year amounted to $119,395. Much interest is taken in the schools, and many fine structures have been erected; the new school building at Stillwater, completed in 1896, costing $12,000. The University at Norman had an average attendance for 1895 of 160 students. Tuition is free, support coming from both the territory and the general government. The Normal School at Edmond had an attendance of 101 pupils whose tuition was without cost, the institution being supported by territorial appropriations. At the same place a colored normal school is in course of erection. The Agricultural and Mechanical College at Stillwater opened in 1895, with 104 pupils at the first term. This institution enjoys a liberal Congressional endowment, and one third of the proceeds of the school fund arising from the Cherokee Strip also comes into its treasury.

Up to 1895 the insane of the state were cared for at Jacksonville, Illinois. That year the territorial authorities contracted with an institution at Norman for the care of patients. Territorial convicts are committed to the prison at Lansing, Kansas, under contract with that state. The number of prisoners at the close of 1894 was 35.

From 1891 there has been an almost constant agitation throughout Oklahoma in regard to statehood, and several bills have been introduced into Congress looking to the admission of the territory into the Union. The plan most favored is to combine Indian Territory with Oklahoma when an arrangement can be affected with the Indian tribes on reservations there.

The territorial government consists of a governor, appointed by the President, a territorial treasurer, auditor, attorney-general, superintendent of public instruction, secretary of the board of school-land leases, inspector-general of militia, a chief and three associate justices. The territorial legislature comprises a council and house of representatives, elected biennially and holding biennial sessions not exceeding sixty days in duration. The council consists of 13 members, the house of 26. In addition to the governor, the President appoints for the territory a district attorney and a marshal. Guthrie is the capital.

In 1890 there were in Oklahoma 123 church organizations, 41 edifices, a church membership of 4,901, which was 7.93 per cent of the entire population, and church property of the value of $61,575. There were 9 Baptist organizations, 13 Roman Catholic, 10 Congregationalist, 51 Methodist (all bodies), 21 Presbyterian (all bodies), and 9 Disciples of Christ.

On January 1, 1899, there were 138 newspapers, of which 13 were daily, 116 weekly, 1 semi-monthly, and 8 monthly. Papers were published in 24 of the 26 counties, and in 60 of the cities, towns, and villages, of which 24 were county seats.

The following are the principal cities and towns of Oklahoma, with the population for 1900: Oklahoma, 10,037; Guthrie, 10,006; Shawnee, 3,462; El Reno, 3,383; Enid, 3,444; Kingfisher, 2,301; Perry, 3,351; Ponca, 2,528; Stillwater, 2,431; Pawnee, 1,464; Alva, 1,499; Blackwell, 2,283; Chandler, 1,430; Norman, 2,225.

The names of the governors are G. W. Steele, 1890–92; A. J. Seay, 1892–93; Wm. C. Renfrow, 1893–97; C. M. Barnes, 1897; T. B. Ferguson, 1901.

OKLAHOMA, University of, a non-sectarian institution of higher learning established by act of the Oklahoma territorial legislature at Norman (q. v., in these Supplements) in 1892. In 1901 there were 21 instructors and 272 students. It has a library of 7,000 volumes. The institution is supported by a territorial tax and by endowment from the United States government. Its total income in 1896 was $16,300.

OKLAHOMA CITY, a city and the capital of Oklahoma County, central Oklahoma, on the North Fork of the Canadian River, and on the Atchison, Topeka and Santa Fé and the Choctaw, Oklahoma and Gulf railroads, thirty miles S. of Guthrie. It was founded upon the opening of Oklahoma Territory for settlement in April, 1889. Within one month, eight hundred houses had been built. In the intervening five years from the date of its origin, $150,000 had been expended in paving, fire protection, sewerage and lighting. The city has a complete telephone system and free mail-delivery. It has several manufacturing establishments, a cold-storage plant and a large grain-elevator, and has a large trade in agricultural products and lumber. Population 1890, 4,138; 1900, 10,037.

OKOLONA, a village of Chickasaw County, northeastern Mississippi, about seventy miles S. of Corinth, on the Mobile and Ohio railroad. It contains a number of prosperous educational institutions and business houses. Population 1890, 2,099; 1900, 2,177.

OKRA. See GUMBO, Vol. XI, p. 244.

OLAF, SAINT. See NORWAY, Vol. XVII, p. 601.

OLAF, TRYGVASON. See NORWAY, Vol. XVII, pp. 600, 601.

OLATHE, a city and the county seat of Johnson County, Kansas, on the eastern border of the state. It lies in the rich farming country just south of the Kansas River, has some industrial establishments, and is the seat of a state institution for the deaf and dumb. It is twenty miles southwest of Kansas City and is reached by the Atchison, Topeka and Santa Fé and the Missouri, Kansas and Texas railroads. Its population in 1900 was 3,451. W.F.J.

OLD GERMAN LANGUAGE. See GERMANY, Vol. X, pp. 462–464.

OLDHAMIA, a fossil of undetermined affinities found in the Cambrian system in Ireland. Some authors consider it a polyzoon or a hydrozoon, while others think it may be a plant.

OLD MAN'S BEARD. See FRINGE TREE, in these Supplements.

OLD POINT COMFORT, a village of Elizabeth City County, Virginia, at the south end of Chesapeake Bay, adjacent to Fortress Monroe, at the mouth of James River, and about 14 miles N. of Norfolk; is a well-known watering-place, and has good bathing-grounds and a fine hotel.

OLD RED SANDSTONE. See GEOLOGY, Vol. X, pp. 301–306.

OLD TOWN, a village of Penobscot County, southern central Maine, near the west bank of the Penobscot River, on the Maine Central and the Bangor and Aroostook railroads, 12 miles N.E. of Bangor; has extensive water-power, and is chiefly supported by its lumber business. Population 1890, 5,312; 1900, 5,763.

OLD-TWO-SEED-IN-THE-SPIRIT PREDESTINARIAN BAPTISTS. See BAPTISTS IN THE UNITED STATES, in these Supplements.

OLEACINIDÆ, a family of air-breathing gasteropod mollusks. The term is equivalent to *Glandinidæ*. The most most important genus is *Glandina*, of which several species are common in the southern United States.

OLEAN, a city of Cattaraugus County, southwestern New York, 70 miles S. of Buffalo, on the Olean Creek, and on the Erie, the Western New York and Pennsylvania, and the Central New York and Western railroads. It has oil and manufacturing interests, and is in a dairying district. Population 1890, 7,358; 1900, 9,462.

OLEASTER, a name applied, in general, to members of the family *Elæagnaceæ*, a species of *Shepherdia* and *Elæagnus*, the well-known buffalo-berries and silver-berries.

OLEFIANT GAS. See ETHYLENE, in these Supplements.

OLEIC ACID, one of the acids present in olive, almond and other oils, in which it exists as glyceryl oleate, the compound being known as olein or elain. At temperatures above 57° F. it exists as a colorless liquid fluid, of an oily consistence, devoid of smell and taste, and if it has not been exposed to air, exerts no action on vegetable colors. At 40° it solidifies into a firm, white, crystalline mass, and in this state it undergoes no change in the air; but when fluid, it readily absorbs oxygen—very slowly if pure—becomes yellow and rancid, and exhibits a strong acid action with litmus paper. Oleate of potash forms a soft soap, which is the chief ingredient in Naples soap; while oleate of soda is a hard soap, which enters largely into the composition of Marseilles soap. Of recent years, a large number of oleates have come into use in medicine, which depend for their activity on the remarkable ease with which they are absorbed by the skin. Such are the oleates of zinc, mercury, lead, tin, morphia, etc., which in this form produce more rapid results than when applied as ointments.

OLEFINES. See CHEMISTRY, Vol. V, pp. 484, 485.

OLEOMARGARINE. See OLEOMARGARINE, Vol. XVII, p. 782; and BUTTER, in these Supplements.

OLEOMETER, an areometer or balance for ascertaining the densities of fixed oils. It consists of a very delicate thermometer-tube, the bulb being large in proportion to the stem, so weighted and graduated as to adapt it to the densities of the leading fixed oils. On the scale is marked the principal oils of commerce, with their specific gravity opposite. The standard temperature of the oleometer is 59° F.

OLIBANUM. See FRANKINCENSE, Vol. IX, p. 624.

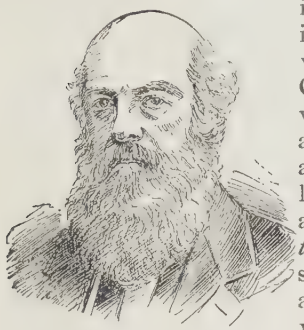
OLIFANT RIVER, a forked stream of Cape Colony, which rises in the mountains N.E. of Cape Town, and, after a northwesterly course of 150 miles, enters the Atlantic. Area of drainage basin, 13,000 square miles. Another stream bearing the same name rises in the Transvaal, and goes east to join the Oori.

OLIGARCHY, a form of GOVERNMENT; q.v. Vol. XI, pp. 11 et seq.

OLIGOCHÆTA, a family of worms. See ANNELIDA, Vol. II, pp. 61, 62.

OLIPHANT, CAROLINE. See NAIRNE, BARONESS, Vol. XVII, p. 174.

OLIPHANT, LAURENCE, a British traveler and author; born in Cape Town, South Africa, in 1829. He was educated in England but went out while very young to Ceylon, where his father was chief justice. He afterward visited Nepaul, and upon his return published his observations in a work entitled *A Journey to Katmandu*. He next studied law at Edinburgh, and at Lincoln's Inn, and was called to the bar in 1855. In 1852 he went to Russia, and, among other provinces of that country, visited the Crimea. In the following year he produced an account of his wanderings in a work entitled *The Russian Shores of the Black Sea*. His next occupation was as private secretary to the Earl of Elgin, whom he accompanied to Canada; and when the earl was appointed high commissioner to China, Mr. Oliphant again acted in his former capacity. In 1856 he published *The Transcaucasian Campaign of Omar Pasha*. Toward the close of the year 1860 he gave to the public an account of his observations in China and Japan, in his *Narrative of the Earl of Elgin's Mission in the Years 1857–8–9*. He then wrote *Patriots and Filibusters, or Incidents of Political and Exploratory Travel*, and *Piccadilly*. In 1861 he was made *chargé d'affaires* at Pekin, a post he resigned in 1862, in consequence of wounds received in an encounter with assassins. For a short period he was Paris correspondent of the *Times*, and from 1865 to 1868 sat in Parliament for Stirling Burghs. In 1870 he went to the United States and joined a mystic brotherhood near Dunkirk, New York, presided over by Thomas Lake Harris, a remarkable impostor. After losing both health and fortune he went to Egypt and resumed his literary labors. *The Land of Gilead* appeared in 1881, and *Sympneumata, or Evolutionary Forces Now Active in Man*, in 1885. His other works include *Traits and Travesties, Social and Political* (1882); *The Land of Kheim* (1882); *Altiora Peto* (1883); *Haifa* (1887); *Episodes in a Life of Adventure* (1887), and *Scientific Religion* (1888). He died in Twickenham, England, December 23, 1888. W.M.C.



LAURENCE OLIPHANT.

OLIPHANT, MRS. MARGARET O. (WILSON), a British novelist and biographer, and a prolific writer; born in April, 1828, in Wallyford, near Musselburgh, Scotland; died in Wimbledon, June 25, 1897. The first of her numerous works of fiction, which abound, in part, in delightful delineations of Scottish life and character, with other and varied studies of English domestic and social life, appeared in 1849, under the title of *Passages in the Life of Mrs. Margaret Maitland*. This won for its author instant success, and she followed it by a number of other stories, always written in easy, unaffected English, and with a scrupulous regard for conventionalities. The best of her early novels are *Adam Graeme of Mossgray* (1852); *Magdalen Hepburn* (1854); *Katie Stewart* (1856); and *The Quiet Heart* (1856). These are characterized by much delicate and quiet humor, with occasional touches of tender pathos. In 1866 her fame as a novelist was much heightened by the publication, in *Blackwood's Magazine*, of *The Chronicles of Carlingford*, and its pendant, *Salem Chapel*, the latter dealing with English dissent. These were followed by a sheaf of novels in a wide range of fiction, in which Mrs. Oliphant interests without descending to sensation or touching forbidden themes. Her later stories, which were most successful, are *The Perpetual Curate* (1864); *Miss Marjoribanks* (1865); *Agnes* (1866); *John* (1868); *The Laird of Norlaw* (1869); *White Ladies* (1871); *The Cuckoo in the Nest* (1892); *The Second Son* (1888); *He That Will Not When He May* (1880); *The Heir Presumptive and the Heir Apparent* (1891); *Kirsteen* (1890); *The Ladies Lindores* (1883); and *The Marriage of Elinor* (1893). A civil-list pension of £100 was conferred on Mrs. Oliphant in 1868. In addition to her industry as a novelist, she published the following biographies: *Life of Edward Irving* (1862); *St. Francis of Assisi* (1870); *A Memoir of Count de Montalembert* (1872); with monographs on *Dante* and *Cervantes* in the series, which she edited, of Foreign Classics for English Readers. In 1888 appeared her *Memoirs of Principal Tulloch;* in 1891, a *Life of Laurence Oliphant;* in 1893, a study of *Thomas Chalmers;* and in 1896, *Joan of Arc*. She also wrote a work entitled *Royal Edinburgh* (1890), and a series of antiquarian and art volumes, on *The Makers of Florence* (1876); *The Makers of Venice* (1888); and *Jerusalem* (1894). In criticism she produced *The Literary History of England* from *1790 to 1825* (1882); and a continuation, *The Victorian Age of English Literature* (1892). *A Little Pilgrim* (1882), speculations about the unseen world, though published anonymously, is understood to be from Mrs. Oliphant's pen.

MRS. OLIPHANT.

OLIVENZA, a fortified town of Spain, near the Portuguese frontier, 20 miles S.W. of Badajoz. Population, 7,759.

OLIVER, PETER, an American jurist; born in Boston, Mass., March 26, 1713. He graduated at Harvard in 1730; afterward filled several stations in Plymouth County; and in September, 1756, was promoted to the chief-justiceship of the superior court. In March, 1774, the House of Representatives, voting the judges of the superior court sufficient salaries from the Colonial

treasury, ordered them to refuse any gifts from the king. Oliver refused to comply, was impeached, and went to England, where he was pensioned. He was an enthusiastic antiquarian, and carried away with him many valuable records. He died in Birmingham, England, Oct. 13, 1791. E.E.T.

OLIVER OPTIC. See ADAMS, WILLIAM TAYLOR, in these Supplements.

OLIVET, a village of Eaton County, in central southwestern Michigan, 30 miles S.W. of Lansing, on the Chicago and Lake Huron railroad; known principally as having Olivet College (non-sectarian) a co-educational institution organized in 1859, and having, in 1900, 24 instructors, 219 pupils and a library containing 26,000 volumes. Population 1900, 800.

OLIVIDÆ, a family of gasteropod mollusks especially abundant in tropical seas. The beautiful oval shells known as olive shells are eagerly sought by collectors. The harp-shells belong to the family. Many species are found in the United States.

OLIVINE GROUP. See MINERALOGY, Vol. XVI, p. 427.

OLLIVIER, ÉMILE, a French statesman; born in Marseilles, July 2, 1825. Having studied law in Paris, he began to practice as an advocate in that city, and by clever pleading established a reputation at the bar, and after 1864 acquired influence as a member of the Legislative Assembly. In 1865 the viceroy of Egypt appointed him to a high judicial office in that country. But he still took an active interest in French politics, and in January, 1870, Napoleon III charged him to form a constitutional ministry. He was displaced after the first reverses in the rash invasion of Germany, and retired to Italy. He wrote *Lamartine* (1874); *Thiers* (1879); *L'Église et l' État au Concile du Vatican* (1879); *Principes et Conduite* (1875); *Nouveau Manuel de Droit Ecclésiastique Français* (1885); *1789 et 1889* (1890); and other books of a historical and political character.

OLMSTED, FREDERICK LAW, an American landscape gardener; born in Hartford, Conn., April 26, 1822. He studied engineering and agricultural science at Yale, and practised farming. He made several tours in Great Britain, the continent of Europe and the southern and southwestern States for purposes of agricultural and landscape study. He embodied the results of some of these tours in *Walks and Talks of an American Farmer; Our Seaboard Slave States; A Journey Through Texas; A Journey in the Back Country; The Cotton Kingdom;* etc. In 1856 he was appointed superintendent of the proposed Central Park, New York, and the following year the plans prepared by Calvert Vaux and himself were accepted, and Mr. Olmsted was appointed architect and chief engineer. He was secretary of the United States Sanitary Commission, 1861–63, and, with his partners, has designed public parks in New York, Brooklyn, Boston, Detroit, Rochester, Niagara Falls, Bridgeport, Trenton, Montreal, Buffalo, Chicago, Milwaukee, Louisville, etc. He died in Boston, Mass., Aug. 28, 1903. E.E.T.

OLNEY, a city in the township of the same name, and the capital of Richland County, southeastern Illinois, about 115 miles from St. Louis, Missouri, 31 miles from Vincennes, Indiana, and 53 miles from Mattoon, Illinois, on the Baltimore and Ohio Southwestern and the Peoria, Decatur and Evansville railroads. It is handsomely built, containing, among other structures of note, a county courthouse, school-building and national bank, ten churches, three flouring-mills, a brass-foundry and woolen manufactory. The city supports three weekly papers. Population 1890, 3,831; 1900, 4,260.

OLNEY, JESSE, geographer, was born at Union, Conn., on October 12, 1798, and became the author of some of the most widely used text-books of the time. His *Geography and Atlas*, published in 1828, revolutionized the methods of teaching geography, and for a generation stood at the head of works of that class. His school reading books, his *Common School Arithmetic* and his *History of the United States*, also had great and well deserved popularity. He published other books, including a volume of poems. He died on July 31, 1872. W.F.J.

OLNEY, RICHARD, an American statesman; born in Oxford, Massachusetts, Sept. 15, 1835. He was graduated from Brown University in 1856, and spent the next three years at the Harvard Law School. He was admitted to the bar of Massachusetts and began the practice of his profession in Boston. He was successful as a lawyer, and took high rank in his state. Beyond holding a seat in the Massachusetts legislature in 1874, he took no part in politics. He was chosen by the Democratic party once as their candidate for attorney-general of Massachusetts, but was defeated in the election. He was made a member of Cleveland's second Cabinet, holding the portfolio of Attorney-General. Upon the death of Secretary of State Gresham, Olney was appointed, June 10, 1895, served until 1897.

RICHARD OLNEY.

OLSHAUSEN, JUSTUS, a German Orientalist; born at Hohenfelde, Holstein, May 9, 1800; from 1823–53 professor at Kiel; in 1853 chief librarian and professor of Oriental languages at Königsberg, and in 1858 a counselor; retired in 1874; died Dec. 28, 1882. He wrote *Pelehwe Legenden auf den Münzen der Letzten Sassaniden; Emendation Zum Alten Testament; Das Lehrbuch der Hebräischen Sprache.* G.A.S.

OLYMPIA, a city and the capital of Washington, and the county seat of Thurston County, in the southwestern part of the state. It lies on a peninsula at the head or southern end of Puget Sound, on the Des Chutes River. It is principally concerned in the lumber industry and

ship-building, being surrounded by fine forests of pine and fir, and having an ample water power and a commodious harbor. The city contains the various state buildings and offices, and is well equipped with schools, libraries and churches, and the general appurtenances of an urban community. It is reached by the Northern Pacific railroad and by steamers on Puget Sound, and had in 1900 a population of 3,863. W.F.J.

OLYMPIADS, periods of time in ancient Greece. See CHRONOLOGY, Vol. V, pp. 617, 618.

OLYMPIAN GAMES. These memorable Panhellenic games, which were abolished by the Emperor Theodosius in A.D. 394, are past beyond restoration, but a reminiscence of them was attempted, April 6–9, 1896, in Athens. The suggestion of reviving these sports came from Baron de Coubertin, a French lover of athletic games, and he was supported by the French Union of Athletic Clubs. The project appealed to Hellenic pride, and rich Greeks in London, Paris and Alexandria gave freely to this purpose. The old Stadium at Athens had been excavated in 1869–1870, and Mr. Averoff of Alexandria bore the cost of its restoration for the purpose of reviving there scenes that his ancestors applauded centuries before at Olympia, in Elis. The Stadium is 656 feet long and 160 wide, and can seat nearly 50,000 persons.

It was thought that a generous rivalry of civilized nations might replace the old competition of the states of Hellas, and that amateur sport might come to a wider recognition should representatives of the youth of different nations contend for crowns of olive and laurel in classic Athens. Competitors came forward from Greece, France, Germany, England, Australia and the United States. Of the ancient games, the chariot-races, boxing and wrestling matches were not revived; the foot-races and throwing the discus had the traditions of twenty-six centuries behind them; but vaulting, hurdle-racing, the hop-skip-and-jump, fencing and bicycling were contributions of modern athletics to the contest. There were 44 events to come off in four days, and the King presided. It is believed that the games were witnessed by 100,000 persons, many of whom were visitors in Athens. To all the citizens gave a generous hospitality, and while desirous that the honors should fall to their own youth, gave cordial recognition to the victors from beyond the seas. The principal event was a foot-race from the battle-field of Marathon to the goal at the Stadium, a distance of 26.1 miles, over the road taken by the messenger of Miltiades, who reached Athens with breath enough to cry the defeat of the Persians and then fell dead in his tracks. Appropriately, this race was won by Loues, a Greek peasant, who made the distance in 2 hours 48 minutes. It was the only victory that fell to the Greeks, but it was the most notable one. A Princeton student, Robert Garrett, threw the discus 95.6 feet, exceeding by 6 inches the ancient record of Phayllus. Of the other principal contests the Americans carried off the honors for the hop-skip-and-jump, the long jump, the 400-meter race, and putting the weight; a Dane won the first place in weight-lifting; an Australian took the olive wreath for the 1,500-metre race; while for bicycling and fencing, that distinction fell to the French.

The prizes were conferred by the King of Greece, and consisted of olive crowns for the winners and laurel crowns for those who stood second. The festival ended with a royal banquet and a purpose to count an Olympiad to another set of similar international athletic games.

OLYMPIC GAMES. See GAMES, Vol. X, pp. 57–59; and OLYMPIA, Vol. XVII, pp. 787, 788.

OLYPHANT, a borough of Lackawanna County, northeastern Pennsylvania, on the Lackawanna River, and on the Delaware and Hudson railroad, eight miles N. of Scranton. It is an important mining-town, and enjoys a large trade connected with the coal business. Population 1890, 4,083; 1900, 6,180.

OMAHA, the county seat of Douglas County, Nebraska, and the chief city of that state, lies on the western bank of the Missouri River, opposite the city of Council Bluffs in Iowa, and a few miles north of the mouth of the Platte River. It is fifty miles northeast of Lincoln, the capital of the state. Omaha first rose into national prominence as the eastern terminus of the Union Pacific railroad, and was greatly exploited during the building of that road by George Francis Train and others. It has ever since maintained its place as one of the greatest railroad centers of the west, among the roads entering it being the Union Pacific, the Missouri Pacific, the Chicago, Burlington and Quincy, the Chicago, Northwestern and Wabash, the Chicago, Rock Island and Pacific, the Chicago, St. Paul, Minneapolis and Omaha, and the Fremont, Elkhorn and Missouri Valley. It is the headquarters of the entire Union Pacific railroad system. The commercial and industrial activities of the city are commensurate with its transportation facilities. Its slaughter and packing houses are second only to those of Chicago, and it is a wheat market of vast proportions. The census of 1900 showed it to contain 837 manufacturing or other industrial establishments, with a capital of more than $34,200,000, a yearly output valued at more than $42,900,000, an army of 7,422 employees, and a pay roll of $3,755,816 a year. There are many fine business buildings, rivalling in size those of the largest cities. The social, educational and religious interests of the city have been cared for commensurately with its material development. It has numerous churches, representing nearly all important bodies. It has seven public libraries, an institution for the instruction of the deaf and dumb, and is the seat of Creighton University, a large Roman Catholic institution founded in 1878, and several other seats of learning of high academic rank. There is an extensive and well planned park and boulevard system, and a large rural cemetery, known as Forest Lawn, at the northwest corner of the

city. The population of Omaha in 1900 was 102,555. W.F.J.

OMAHAS. See INDIANS, Vol. XII, p. 871.

OMAN, DISTRICT OF. See ARABIA, Vol. II, pp. 207, 208.

OMAR PASHA, a Turkish general; born in Plaski, Croatia, in 1806. His father was an Austrian officer. The son, under his proper name, Mikail Lattas, served for a time in the Austrian army. To escape punishment for some breach of discipline, he fled to Turkey, and there, having embraced the Moslem faith, changed his name to Omer. He became connected with the households of several high officials, and was made tutor to the heir apparent to the Turkish throne. He was advanced rapidly in rank and position, was made Pasha in 1843, and given command of the army in Armenia and Bosnia. He was at the head of the Turkish forces against the Russians in 1853–56, and was successful in every battle, with the exception of Kars. He was afterward governor of Bagdad, and put down the rebellion of the Montenegrins in 1862. Died April 18, 1871.

OMAYYADS, a Turkish dynasty. See MOHAMMEDANISM, Vol. XVI, pp. 588–600.

OMBAY OR ALLOR, Dutch East Indies, an island in the chain of the Malay Archipelago between Pantar and Wetta islands, on the east, and separated from Timor on the south, by Ombay Pass. The island is 60 miles long with a maximum width of 20 miles, and partakes of the volcanic, mountainous, and other characteristics of the archipelago and region. Allor on the northwest and Bailoko on the south are the principal Dutch trading settlements on its shores. Population, 105,000. C.L.S.

OMDURMAN, town in Egyptian Sudan (opposite the site of Khartum), founded in 1886 by the Khalifa, who razed Khartum to the ground and removed its population to this place. It was captured by Lord Kitchener (q. v., in these Supplements) after the battle of Omdurman, Sept. 2, 1898. Population about 60,000.

OMMANNEY, SIR ERASMUS, a British admiral; born in London in 1814. He entered the navy in 1826; in 1837 served against Portugal and at the battle of Navarino; was with James Ross in the Arctic expedition of 1835; became commander in 1840. As captain, he was one of the government relief committee during the Irish famine of 1846; and in 1850 went with Austin on the Franklin search expedition, and was the first to discover traces of the lost ships. He was deputy controller of the British coast guard until 1854, and in 1854–55 was commander of the White Sea and Gulf of Riga squadrons in the war with Russia. He was made rear-admiral in 1864, and knighted. He soon retired and devoted himself to astronomical study. Died at Portsmouth, Eng., Dec. 21, 1904.

OMNIBUS, STEAM. See AUTOMOBILE VEHICLES, in these Supplements.

ON, an ancient Egyptian city, also called Heliopolis. See EGYPT, Vol. VII, p. 667.

ONAGER OR KOULON, a wild ass of Central Asia. See Ass, Vol. II, p. 626.

ONATE, JUAN DE, a Spanish explorer and colonial governor; born in Guadalajara, Mexico, about 1555. He was a son of the founder Guadalajara and married a granddaughter of Cortes. In 1595 permission was granted him by Velasco to colonize the district north of the Rio Grande but he was not given full power as governor until 1598. He then set out on his expedition with a large force of soldiers and Indians. He crossed the Rio Grande River and founded San Juan, the first capital of New Mexico. During the next ten years the colony prospered and Onate made numerous expeditions into Arizona. He died in San Juan, New Mexico, in 1611. W.M.C.

ONAWA, a town and the county seat of Monona County, Iowa, in the center of the western border of the state. It lies in the agricultural region between the Little Sioux and Missouri rivers, and is reached by the Chicago and Northwestern and Illinois Central railroads. Its population in 1900 was 1,933. W.F.J.

ONCHIDIUM, a genus of air-breathing gasteropod mollusks, found in warm regions. Some species are terrestrial, others aquatic. An Indian species which lives on the shores between tidemarks is of great interest because of the condition of the eyes. These are scattered over the whole upper surface, and in their structure and development closely resemble the vertebrate eye.

ONEIDA, a village of Madison County, New York, in the central part of the state. It is five miles southeast of Oneida Lake and twenty-seven miles east of Syracuse, is reached by the New York Central and Hudson River and New York, Ontario and Western railroads, and had in 1900 a population of 6,364. W.F.J.

ONEIDA INDIANS. See INDIANS, Vol. XII, pp. 867, 871; and IROQUOIS, in these Supplements.

ONEIDA LAKE, a fine sheet of water in the north-central part of New York state, bounded by and forming parts of Oneida, Madison, Onondaga and Oswego counties. It is twenty miles long from east to west, and five miles wide from north to south. W.F.J.

O'NEILL, a village and capital of Holt Co., N.E. Nebraska, 38 miles S.W. of Nebraska City on the Fremont, Elkhorn and Missouri Valley and the Sioux City, O'Neill and Western railroads; has railroad repair-shops. The district is devoted to agriculture and stock-raising. Pop., 1900, 1,107.

ONEONTA, a village of Otsego County, New York, in the central part of the state. It is nineteen miles south by west from Cooperstown, in an agricultural region of great fertility and beauty, and is reached by the Delaware and Hudson Canal Company's railroad. It is upon the upper part of the Susquehanna River, which affords it a water supply, and it has some manufacturing industries. It is the seat of a state normal school. Its population in 1900 was 7,147. W.F.J.

ONION. See HORTICULTURE, Vol. XII, p. 297.

ONOMASTICON. See POLLUX, JULIUS, Vol. XIX, p. 417.

ONONDAGA INDIANS. See INDIANS, Vol. XII, pp. 867, 871; and IROQUOIS, in these Supple'ts.

ONONDAGA LAKE, in Onondaga County, two miles N.W. of Syracuse; about five miles in length and one mile wide, its greatest depth being 65 feet. It lies in an ancient and deep excavation in the Onondaga salt group; in the vicinity of this lake are the most productive salt-springs of the United States. Its waters pass by a short outlet to Seneca River.

ONTARIO. In the Canadian Dominion, the province of Ontario (formerly called Upper Canada) holds the chief place, since it is the wealthiest and most populous province, and the most progressive of the commonwealths within the Confederation. Its area is 222,000 square miles, of which only the south-eastern portion as yet is populated. This is the region bounded on the north and east by the St. Lawrence and the Ottawa rivers, and on the south and west by Lakes Ontario, Erie and Huron, with its inland expanse of the Georgian Bay. Within this area the population of the province (which, in 1901, was 2,182,942) is mainly to be found; the remainder being sprinkled along the lines of sparse settlement in the wilderness extension of Ontario, westward to the Lake of the Woods, and northward to the Albany River and James's Bay. The physical aspect of Ontario is unmarked, save for its abounding water. Nowhere do the elevations exceed one thousand feet, and this chiefly along the Laurentian ridge (locally known as the "Height of Land"), that trends northwestward from Labrador, and back of the older and settled portions of the province. South of this ridge, which forms the watershed of the region, the rivers drain into the St. Lawrence system; north of it, they drain chiefly into Hudson Bay. The eastern and southern portions of Ontario, which include the rich and fertile peninsula surrounded by the lakes, is divided, for municipal and electoral purposes, into 42 counties. This is the region of agricultural operations and cognate pursuits, and of the industries that contribute to the commerce and consequent wealth of Ontario. The larger and newer area of the province, lying to the north and west of the more compact and organized section, is divided into six provisional districts, known as Muskoka, Parry Sound, Nipissing, Algoma Thunder Bay, and Rainy River. Here, chiefly, the lumberman and miner find their field of exploits,—the region, so far as it has been surveyed, being rich in arboreal and mineral wealth. The winter in this northern latitude is long, and as a rule severe, and there is usually a heavy snowfall. At Port Arthur, at the head of Lake Superior, and 610 feet above the sea, the mean temperature in summer is 55°, and in winter 9°. At Ottawa City the summer average is 65° and the winter 15°, while at Toronto, the provincial capital on Lake Ontario, the summer average is 64° and the winter 24°.

The climate in the Ontario peninsula is very favorable for farming, cattle-raising, and the growing of the hardier grain and root crops. Horses and cattle thrive well in this region of the province, and find rich pasture. The area of occupied land is in the neighborhood of twenty-three million acres, about half of which is cleared. A little over eight million acres of the cleared land was, in 1894, under crop, while two and three quarter million acres were under pasture, and close upon two hundred thousand acres were in gardens and orchards. In 1900 the cultivated acreage was mainly given to oats, hay, clover, peas, and barley. Wheat (chiefly fall wheat) was raised from a million acres; but of recent years wheat in Ontario has been a precarious and unremunerative crop. In the same year there were about eight million acres in woodland. The yield, in bushels, of the chief field crops was, for 1900, as follows: Wheat, 30,000,000; oats, 90,000,000; barley, 17,000,000; peas, 14,000,000; turnips, 59,000,000; potatoes, 21,500,000; corn (for husking), 27,000,000; mangel-wurzels, 24,700,000. The yield of hay and clover for the same year was 3,500,000 tons. This cereal yield, though it is eclipsed by Manitoba, and by a number of the grain-growing Western states of the Union, is, on the whole, a fair showing, and is better than the yield in such states as New York and Pennsylvania, while the average yield per acre is higher. Cheese-making, as has been said in the statistics of the Dominion, is a large and profitable industry in Ontario. The number of factories operated in the province in 1899 was 1,203 the average output per factory, for the year, being over one hundred thousand pounds. The cheese sales averaged, for 1899, $9.83 per 100 pounds.

Ontario has a prosperous showing in the raising and annual sales of live-stock. The value of horses of all kinds in the province, for the year 1899, was close upon $39,000,000, while the yearly sales average eight per cent of the total. The province owns, in value, about $50,000,000 worth of cattle, of which the annual sales aggregate over $15,000,000. The value of sheep owned in the province, for the same year, exceeded $6,500,000, and the sales netted over $2,500,000. The sales of hogs for the year returned nearly $12,000,000. Of poultry (turkeys, geese and other fowls), $1,131,923 worth were sold in the year 1899, out of a total value of nearly $2,578,000 owned in the province. The net amount realized from sales of live-stock of all kinds for the year 1899 was, for the entire province, about $38,000,000, the average per head being as follows: Horses, $72; cattle, $30.00; sheep, over one year, $5.01; under one year, $3.15; hogs, over one year, $12.23; under one year, $3.92; turkeys, 65 cents; geese, 57 cents. A considerable revenue is raised in the province from wool, the clip for the year 1899 being nearly 6,000,000 pounds. Bee-culture is also a profitable industry in Ontario, while a large sum is derived annually from the apple and grape crops.

The statistics of the province show a decline, in recent years, in the value of farm property, including farm-lands and live-stock, though there is an increase in the value of buildings and implements. The estimated total value of all farm property, including lands, buildings, implements and stock throughout the province, was, in the year 1899, $947,513,360. The average value of farm-land in the province, per acre occupied, was, in 1894, $25.49; in 1883 it was $30.56.

The mineral wealth of Ontario, now that lumbering has receded and become less profitable, is at last in a fair way to be developed. The provincial

government has established a bureau of mining, and issued a report of the labors of a royal commission, appointed to inquire into the mineral resources of Ontario and to suggest measures for their development. The report confirms the conclusion already reached by prospectors, that the province contains almost all of the economic minerals in workable quantities, except coal, and "that it has vast possibilities of mineral wealth." The drawbacks to the development of that wealth are the want of access to a near and free market, the lack and great cost of machinery, and the absence of facilities for cheap transportation. Despite the unfavorable economic conditions, much has been attempted by the province in prospecting regions rich in ores, especially the Sudbury district, north of Lake Nipissing, where copper and nickel mines are already being worked, and the silver district west of Port Arthur. So far as the province has been examined by experts, there is conclusive evidence of the abundance, in the central and eastern counties, of magnetic and hematitic iron ores, gold, galena, plumbago, arsenic, mica, fibrous serpentine, apatite, granite, marble and freestone. Along the north shore of Lake Huron, from the mouth of the French River to Sault Ste. Marie, gold and silver bearing veins, iron, copper, galena and immense quarries of marble have been discovered. Other parts of the province are also rich in a great variety of valuable ores. American and Canadian mining companies are, in many promising sections, beginning operations, while a Welsh mining corporation, with large capital, has already got to work. Already the mineral yield for one year has reached six million dollars: of which one-third was expended for labor.

The trade of Ontario grows apace. It has received, of late, moreover, a considerable impulse in the opening up of the Northwest. Manufactures, taking advantage of cheap labor and the abundant water-power of the province, have sprung up extensively along the St. Lawrence, around the lakes and on the larger waterways of the peninsula. These include ship-building, woolen and cotton products, edged tools, stoves, agricultural implements and machinery of all kinds, tram and car building, woodenware, doors and window sashes, and furniture, organs, pianos, trunks, leather goods, boots and shoes, etc. Many of these articles are exported largely to foreign and other colonial markets. The exports of the province can only approximately be given, for the reason that much of the volume of shipments pass through the seaports of Quebec and the maritime provinces, where they are recorded in Dominion rather than in provincial statistics. It is estimated, however, that the annual exports of Ontario amount to $71,000,000 and the imports to $56,000,000. Of the 38 banks making returns to the Dominion government in 1899, 12 of them are Ontario institutions and have their head offices within the province, with a capital bordering on $20,000,000. There were, in 1899, 95 loan and investment companies and building societies doing business in the province, with an aggregate capital and reserve fund of $109,500,000 and total assest of $137,500,000.

The Dominion census of 1901 gives Ontario a population of 2,182,942; the municipal assessors place the figures, for the same year, at 1,922,121, with a gross property assessment of the value of $819,000,000. The population is distributed thus: In townships, 1,116,347; in towns, 296,675; in villages, 128,634; and in cities, 386,465. The cities, twelve in number, are as follow, the population being that estimated for the year 1901. Toronto (the capital of the province), 208,040; Ottawa (the capital of the Dominion), 59,928; Hamilton, 52,634; London, 37,981; Kingston, 17,961; Brantford, 16,619; Belleville, 9,117; Guelph, 11,496; St. Catharines, 9,946; Stratford, 9,959; St. Thomas, 11,485; Windsor, 12,153. Classified by religions, the provincial returns show that 647,518 were Methodists, 452,712 Presbyterians, 385,999 Church of England, 358,330 Roman Catholics, 96969 Baptists and 72,228 were Lutherans, Congregationalists and members of the Salvation Army.

Toronto is the seat of the provincial government and High Courts of Justice. The affairs of the province are administered by an executive and Legislative Assembly, or Parliament, with a lieutenant-governor, who is advised by the executive, or cabinet, composed of eight members. The constituencies are represented in the local legislature by 94 members, including the executive, who are responsible to the legislature, which meets annually. The province is represented in the Dominion or Federal Parliament by 24 members in the Senate, appointed by the crown, and by 92 members in the House of Commons, elected by the people. Unlike the other provinces of the Dominion, Ontario has no public debt, if we except a subvention in aid of local railways, amounting to $3,135,000, payable within forty years. Instead of a debt, the province has assets of the value of $5,700,000 in investments, bank balances, and debts (bearing interest) due it by the Dominion. The financial expenditure of the province for the year 1900 was $4,003,729, and the receipts were $4,192,940. The chief sources of the revenue are the receipts from crown lands and the annual Dominion subsidy, the province's proportion of the excise and customs levies.

Beside the expenditure by the legislature for the maintenance of hospitals and charities and the administration of justice, Parliament appropriates nearly $700,000 annually for the purposes of education. This, of course, is in addition to the sum (close upon $4,500,000 annually) raised by local assessment as a school tax. The number of schools in the province, in 1899, was 6,006, with an average attendance of 269,090 and a staff of 9,333 teachers, two-thirds of whom were women. There were also 352 separate (Roman Catholic) schools, with 41,800 pupils, and a staff of 660 teachers. The province also maintains, besides two normal schools and a number of county model schools, 128 secondary schools for higher education, of which 35 are collegiate institutes. In the latter there is an average attendance of 13,500, with 570 teachers. At the head of the educational system stands the National University (Toronto University and College). It is undenominational, and has affiliated with it a number of theo-

logical colleges, schools of law, medicine, science, music, dental surgery and pharmacy. The other provincial colleges are Queen's (Presbyterian), at Kingston; Victoria (Methodist); Trinity (Episcopal); Wycliffe (Episcopal); McMaster (Baptist); St. Michael (Roman Catholic); and Upper Canada College (Boys' Resident), at Toronto.

ONTARIO, Fort, a fortification at the mouth of the Oswego River, on the eastern bank, near Oswego, New York. It guards the river mouth and the entrance to the harbor. This fort was built by the British in 1756, and was captured by the French under Montcalm that same year. The fort was burned by the French, but rebuilt by the British later, and was the last fortress to be surrendered by the British at the close of the Revolution.

ONTARIO, Lake. See St. Lawrence, Vol. XXI, p. 189, and Vol. XIV, p. 218.

ONTOLOGY. See Metaphysic, Vol. XVI, pp. 85–104.

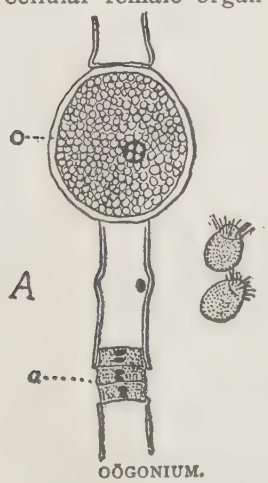
ONTONOGAN, a village and the capital of Ontonogan County, Northern Michigan, forty miles W. of Keenewaur Bay, on the Ontonogan River, and on the Chicago, Milwaukee and St. Paul railroad. It has a copper-smelting furnace, a grist-mill, two steam saw-mills and a cigar factory. Copper is the chief article of export, and is mined about 15 miles from here. Population 1900, 1,267.

ONYCHOTENTHIDÆ. See Mollusca, Vol. XVI, p. 695.

ONYX MARBLE. See Marble, Vol. XV, p. 536.

OÖGAMY, a botanical term to denote that the sexual apparatus of a plant consists of the female organ known as the *oögonium*, which contains an *oösphere* (the female gamete) that is fertilized by the male gamete. Oögamy is characteristic of certain algæ and fungi, and is distinguished in the same groups from *isogamy*, in which the gametes are alike, and *carpogamy*, in which the female organ contains no organized oösphere, and is therefore not an oögonium. (See Oögonium in these Supplements.)

OÖGONIUM, a botanical term to denote a unicellular female organ in which a female gamete (*oösphere*) is differentiated. Oögonia are present in certain algæ and fungi, and in them the process of fertilization takes place. In the accompanying figure, A represents a portion of the filament of *Œdogonium*, a common green alga. One of the cells (o) has developed into an oögonium, which contains a single large oösphere (female gamete) which completely fills it. Another region of the filament (a) has divided up into three short cells, each of which is a male organ (*antheridium*) in which is developed the male gametes (*spermatozoids*). B represents two zoöspores, or swimming spores, from the same filament, each of which has the power of producing a new filament, but which has no connection with the sexual work. See Morphology in these Supplements.



OÖGONIUM.

OÖLITIC LIMESTONE. See Geology, Vol. X, pp. 314–317; and Building, Vol. IV, p. 420.

OÖRI, a river of southeastern Africa, which has its source in the heart of the Transvaal, between Pretoria and Potchefstrom, describes a huge curve to the north and joins the Indian Ocean a little north of Delagoa Bay. Its course exceeds eight hundred miles, and it has numerous tributaries, the most important being the Olifant, from the right. It has been ascended fifty miles by steamboat, but its upper reaches are obstructed by rapids and falls.

OÖSPHERE, a botanical term applied to the female sex-cell, or gamete, which is fertilized by the male cell. It is usually developed in distinct female organs (oögonia and archegonia). See Archegonium and Morphology, in these Supplements.

OÖSPORE, a botanical term applied to the cell which results from the fertilization of an oösphere, is the first cell of a new generation, and in the case of alternate generations, the first cell of the sporophyte. See also Morphology in these Supplements.

OOSTERHOUT, a town in North Brabant, Holland, six miles N.E. of Breda. It contains sugar factories, tanyards, breweries and potteries. Population, 10,911.

OPACITE, a name given by petrologists to minute black, opaque, amorphous aggregates, grains and patches of indeterminate mineral matter, which are seen in many igneous rocks when these are viewed in thin slices under the microscope. Opacite is probably, in most cases, hematite, limonite, magnetite, or other iron oxide, and is a product of the chemical alteration of one or other of the original mineral constituents of the rock in which it occurs.

OPELIKA, a city and the county seat of Lee County, Alabama, at the center of the eastern border of the state. It is in a cotton-growing and agricultural region, and is an important railroad center, being reached by the Central railroad of Georgia, the Western railroad of Alabama and the Atlanta and West Point railroad. Its population in 1900 was 4,245. W.F.J.

OPELOUSAS, a town and the parish seat of St. Landry Parish, Louisiana, in the south-central part of the state. It is 122 miles from New Orleans, on the Southern Pacific railroad, and had in 1900 a population of 2,951. W.F.J.

OPEN-HEARTH STEEL. See Iron and Steel, in these Supplements.

OPERA, a musical drama. See Music, Vol. XVII, pp. 93–95, 99, 101, 102, 105, 106; and Music in America, in these Supplements.

OPERA-GLASS. See Telescope, Vol. XXIII, p. 151.

OPERATIVE SURGERY. See Surgery, American, in these Supplements.

OPHIDIA. See Snakes, Vol. XXII, pp. 199–210.

OPHIDIIDÆ, a family of fishes. See Ichthyology, Vol. XII, p. 730.

OPHIOCEPHALIDÆ, a family of fresh-water

fishes peculiar to Asia. These fishes possess an accessory chamber which retains water to moisten the gills. They breathe air direct, and are able to remain out of water for a long time. They are known as walking-fishes, because of their habit of traveling across land. During droughts they burrow in the mud. Their usual habitat is the shallows near the shores. Some species are edible.

OPHIOGLOSSACEÆ, one of the families of ferns, often known as the adder's-tongue family, and composed of rather small ferns, with sessile globular spore-cases (sporangia), opening transversely, and without the ring (*annulus*) found in the ordinary ferns. There are three known genera, *Botrychium*, with sterile part of the frond compound and sporangia in compound spikes; *Ophioglossum*, with sterile part of the frond mostly simple, and the sporangia in a simple spike; and *Helminthostachys*, a genus of the Oriental tropics, with but a single species. The species of *Botrychium* are known as moon-worts; those of *Ophioglossum* as adder's-tongues.

OPHITES. See GNOSTICISM, Vol. X, pp. 626, 627.

OPHITIC STRUCTURE. Same as *Diabase Structure*, in GEOLOGY, Vol. X, p. 210.

OPHIURIDEA, an order of star-fishes. See ECHINODERMATA, Vol. VII, pp. 549, 550.

OPHTHALMOSCOPE. See OPHTHALMOLOGY, Vol. XVII, pp. 808, 809.

OPISTHOBRANCHIA, an order of gasteropodous mollusks, opposed to PROSOBRANÇHIA; q.v., in these Supplements, and see MOLLUSCA, Vol. XVI, pp. 679, 684.

OPISTHOCOMI, a group of birds, equivalent to the *Heteromorphæ* of Huxley. The group contains the single genus *Opisthocomus*. This genus has one species, the hoactzin of South America. A full account of this interesting bird may be found under HOACTZIN, Vol. XII, p. 30.

OPPERT, JULIUS, Assyriologist and Orientalist, was born in Hamburg of Jewish parents, on July 9, 1825, and was educated at Heidelberg, Bonn, Kiel and Berlin. He served as professor of German in several French colleges, and was sent with a government expedition to Mesopotamia. In 1857 he was made professor of Sanskrit at the Imperial Library, and in 1869 a professor in the College of France. He developed a masterly plan for deciphering cuneiform inscriptions, which he laid before the Institute of France, and for which the institute awarded him the grand prize of $4,000. His works, which are of the highest rank in Oriental scholarship, include *Assyrian Studies* (1859–64); a *Sanskrit Grammar* (1859); a *History of the Empires of Chaldea and Assyria from the Monuments* (1866); *Babylonia and the Babylonians* (1869); *The People and Language of the Medes* (1879), and *Mythological Fragments* (1882). W.F.J.

OPPOLZER, THEODOR, an Austrian astronomer; born in Prague, Austria, Oct. 26, 1841. He established a private observatory in Vienna in 1865. He is known by two works, *The Determination of the Paths of Planets and Comets* (1870–80) and *The Law of Eclipses* (1887). The latter includes a catalogue of eclipses of the sun, both annual and total, between 1200 B.C. and A.D. 2160. He died Dec. 26, 1886.

OPTIC, OLIVER, the pseudonym of ADAMS, WILLIAM TAYLOR; q.v., in these Supplements.

OPTIMISM. See PESSIMISM, Vol. XVIII, pp. 698–704.

OQUIRRH MOUNTAINS, a range in Utah, which forms the boundary of the counties of Tooele and Utah, and extends from the south end of the Great Salt Lake in a southerly direction. It abounds in carboniferous limestone and quartzite, and is the locality of some of the most productive silver-mines that have yet been exploited in this country.

ORANGE, a village of Orange township, Franklin County, northwestern Massachusetts, on Miller's River, 15 miles E. of Greenfield, on the Fitchburg railroad. It is the seat of a variety of manufactories. Population 1900, 5,520.

ORANGE, one of the chief residential cities of New Jersey, lies in Essex County, in the northeastern part of the state, just west of the larger city of Newark and within the "metropolitan district" of New York. It serves as a semi-suburban home for thousands of New York and Newark business men. It is reached by the Erie and the Delaware, Lackawanna and Western railroads, and by numerous electric roads Among its public and semi-public institutions are numerous schools and high schools, a public library, a memorial hospital, a Masonic Temple, and buildings for the Young Men's and Young Women's Christian Associations. Its population in 1900 was 24,141. See Vol. XVII, p. 836. W.F.J.

ORANGE OR GARIEP, the largest river of South Africa. It rises in the Kathlamba Mountains, in the east of Basutoland, and flows west, with an inclination to the north, to the Atlantic Ocean. It describes numerous wide curves in its course of 1,000 miles, and separates Cape Colony on the south from the Orange Free State, Griqualand West, Bechuanaland and Great Namaqualand, on the north. Area of basin, 325,000 square miles. Its volume varies greatly between the dry season, when it is not navigable, and the rainy season, when it overflows its banks in the upper parts of its course. Its mouth, moreover, is obstructed by a bar, and its chief affluent is the Vaal.

ORANGE, FREE STATE OF (now Orange River Colony). See AFRICA, Vol. I, p. 242; CAPE COLONY, Vol. V, p. 41; and ORANGE RIVER FREE STATE, Vol. XVII, p. 837. For late information, see AFRICA and BOER WAR, in these Supplements.

ORANGEBURG COURTHOUSE, a village and the capital of Orangeburg County, in central South Carolina, 50 miles S. of Columbia, on the Atlantic Coast Line and the South Carolina and Georgia railroads; manufactures cotton goods, rice and wagons; has several educational institutions, including Claflin University (non-sectarian), a co-educational institution for the use of colored students, founded in 1869, which had, in 1902, 30 instructors, 750 students and a library containing 6,000 volumes. The State Agri-

cultural College is also here. Population Orangeburg City 1890, 2,964; 1900, 4,455.

ORANGE CITY, a town and the county seat of Sioux County, Iowa, in the northwest part of the state. It lies on the Floyd River, forty miles north by east from Sioux City, and is reached by the Chicago and Northwestern railroad. Its population in 1900 was 1,457. W.F.J.

ORANGE-OIL. See ORANGE, Vol. XVII, p. 835.

ORANG-OUTANG. See APE, Vol. II, p. 130.

ORATORIANS. See MONACHISM, Vol. XVI, pp. 739, 742.

ORBIGNY, ALCIDE DESSALINES D', a French explorer and scientist; born near Paris, September 6, 1802. He was educated at the College of Paris and at the age of twenty-four headed an exploring expedition to South America. He returned to Paris in 1834, but made a subsequent visit to Brazil. He was appointed professor of palæontology at the Paris Museum of Natural History in 1856. He was a contributor to the *Universal Dictionary of Natural History* and also published *Travels in South America* (1847), and the *Palæontology of France* (1854). He died in Pierrefitte, France, June 30, 1857. W.M.C.

ORCEINE. See ARCHIL, Vol. II, pp. 331, 332.

ORCHARD PRODUCTS IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

ORCHARDSON, WILLIAM QUILLER, a Scottish *genre* painter; born in 1835, in Edinburgh, where subsequently he studied under Scott Lauder at the Trustees' Academy. Among his works are *An Old English Song* (1863); *Scene From Shakespeare's Henry IV.* (1868); *On the Grand Canal* (1871); *The Queen of the Swords* (1877); and *A Social Eddy* (1878).

ORCHIDS, the common name of plants belonging to the family *Orchidaceæ*, an immense family of monocotyledonous plants, variously estimated to contain from 6,000 to 10,000 species. Most of the species are tropical, occurring especially as epiphytes on trees or in rock crevices. The orchids of the temperate regions are all terrestrial plants. Their very striking, irregular flowers, of the most bizarre forms, and with extremely showy coloration, elaborately adapted to the visits of insects for the purposes of cross-pollination, have made them much prized as ornamental plants.

ORCINE. See ARCHIL, Vol. II, pp. 331, 332.

ORD, EDWARD OTHO CRESAP, an American soldier; born in Cumberland, Md., Oct. 18, 1818. He graduated at West Point in 1839 and was assigned to the artillery. He served in the Seminole war, and in 1847 was ordered to California and was stationed at Monterey. He took part in the Rogue River expedition in 1856, commanding in several battles with the Indians, and in the Spokane River expedition in 1858. In 1859 he was stationed at Fortress Monroe, and in 1861 was commissioned brigadier-general of volunteers and in 1862 major-general of volunteers. He was severely wounded in the battle of the Hatchie, and on his recovery was assigned to command the 18th Army Corps before Vicksburg. He was also engaged in the capture of Jackson, Miss.; took part in the movements before Petersburg; and was again wounded in the assault on Fort Harrison. In 1865 he commanded the Army of the James, and participated in the operations against Richmond and in the historic scene of Lee's surrender at Appomattox Court House. After the conclusion of the war he commanded successively the Departments of the Ohio, of Arkansas, the fourth Military District, of California, the Platte, and of Texas. He retired in 1881 with the rank of major-general in the United States Army. He died in Havana, Cuba, July 22, 1883. E.E.T.

ORDER, in natural history, a group inferior to *class* and *sub-class*, but superior to *family*, *genus*, etc. The term *natural order* was used in botany formerly to express genuine relationship in contrast to purely artificial grouping, but all orders now recognized are supposed to be more or less "natural."

ORDERS, RELIGIOUS. See MONACHISM, Vol. XVI, pp. 724–742.

ORDINATION. See ORDERS, Vol. XVII, p. 844.

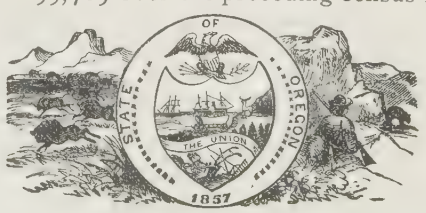
ORDNANCE AND ORDNANCE DEPARTMENT. See ARTILLERY and GUN-MAKING, in these Supplements.

ORDNANCE SURVEY. See SURVEYING, Vol. XXII, pp. 747–748.

ORDOVICIAN, a name sometimes given to a geological formation intermediate between Cambrian and Silurian; otherwise accounted the Lower Silurian strata. It is so called from the Ordovices, an ancient British tribe. See *Lower Silurian*, under GEOLOGY, Vol. X, pp. 293, et seq.

ORDWAY, JOHN MORSE, educator, was born at Amesbury, Mass., on April 23, 1823, and was graduated from Dartmouth College in 1844. For fifteen years he was professor of industrial chemistry and metallurgy in the Massachusetts Institute of Technology, and for a part of that time was also an instructor in Boston University. For thirteen years thereafter he was a professor in Tulane University, New Orleans, and he is now professor of biology in the H. S. Newcomb College of that university. W.F.J.

OREGON had a population in 1900 of 413,536, a gain of 99,769 over the preceding census return.



STATE SEAL OF OREGON.

The area of Oregon is 96,030 square miles, of which 1,470 are water surface. The density of population is 4.4 to the square mile, according to the census of 1900. In 1900, the two cities of the state having a population of 8,000 and over had 98,807 residents, constituting 23.9 per cent of the entire number of inhabitants. Of the citizens of the state, 232,985

were males and 180,551 were females; 84.1 per cent were native-born; 1,105 were negroes, a decrease of 81 since 1890; 10,397 were Chinese; 2,501 were Japanese; and 4,951 were civilized Indians. A state census taken in 1895 gave the population at 362,762.

Agriculture. The soil of Oregon is fertile, and throughout that part of the state lying west of the Cascade Mountains and in the northern section lying east of them the rainfall is adequate for crops. In the central and southeastern portions of the state irrigation is generally necessary. By the census of 1900 the area devoted to cereals was 1,222,644 acres, which produced 23,225,381 bushels of grain. Of the total area devoted to the cereals, 71.4 per cent was in wheat, 21.4 per cent in oats, 4.9 per cent in barley, 1.4 per cent in corn, rye and buckwheat, in the order named; 873,379 acres were devoted to wheat, the crop amounting to 14,508,636 bushels. The oat crop was abundant, the amount raised being 6,725,828 bushels; the barley crop amounted to 1,515,150 bushels. The number of farms (1900) was 35,837, an increase from 25,530 in 1890; the number of acres in farms increased within the period mentioned from 6,909,888 to 10,071,328, and the total value of lands, buildings, farm implements, machinery and live-stock from $143,024,800 to $172,761,287. Horses increased from 224,962 in 1890 to 261,794 in 1900; neat cattle from 520,648 to 577,600; milch cows from 114,156 to 122,447; swine from 208,259 to 281,406, and sheep from 1,708,312 to 1,961,355. The clip of wool also advanced from 9,982,910 to 18,349,660 pounds. Almost 732,000 acres were devoted to hay; approximately, 3,761,367 bushels of Irish potatoes were produced; more than 14,675,577 pounds of hops were raised; and the crop of pulse was in excess of 32,000 bushels.

The country west of the Cascades is adapted to dairying. The generous amount of moisture and mild temperature result in continuous green and luxuriant grasses. Cereals, hay, fruits, vegetables and berries flourish near the coast, and in the extreme southern part of the state, Curry County, figs, olives and other semi-tropical products are successfully grown. In the great Willamette valley every product known to the temperate zone can be produced. The valley is a great storehouse of agricultural wealth. Fruits grow to perfection, especially prunes, pears and apples, while root crops and vegetables thrive abundantly. Horses, sheep and swine all find the section adapted to their increase; the wool produced is of excellent quality. The wheat raised in this valley commands the highest market prices for the grain. Other portions of the state, as, for example, the Umpqua and Rogue River valleys, are essentially fruit-raising sections. Prunes, pears, peaches, plums, grapes, berries, melons and apples all do well. East of the Cascades many of the leading fruits are raised, with the aid of irrigation, in the river valleys, especially along the Columbia. Back from the valleys the great wheat-fields spread in all directions, while farther removed the stock-ranges begin.

Manufactures. According to the census of 1900, Oregon had 3,088 manufacturing industries, in which the capital invested amounted to $33,422,393, the number of persons employed to 17,236, their annual wages to $8,333,433, and the total output to $46,000,587. Leading among the industries were car and general shop construction, $1,026,169; fish, canning and preserving, $1,788,809; flouring and grist-mill products, $6,364,023; printing and publishing, $1,078,337; woolen goods products, $937,824; lumber and timber products, exceeding in value $10,000,000; slaughtering and meat-packing, wholesale, $1,638,480. The largest showing made by any county in the state was that of Multnomah, value of products (1900), $24,750,579.

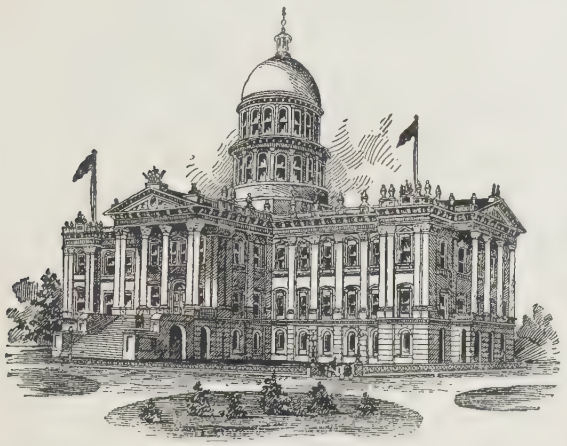
Fisheries. In the twelfth decennial census the value of the fish products of 1900 was given at $3,027,971. Since that date great advances have been made in the industry, legislative action has been invoked for the preservation of the fish and the regulation of the industry, and much additional capital has been invested in canneries. The census reports show 2,832 persons employed, capital to the amount of $913,427 invested, and products amounting to $1,176,936. This did not include the products of the salmon canneries, which were included among the manufactured products. The business has been increased from the figures given above, until, in 1901, the total value of the fisheries of the state were, approximately, $3,200,000.

Minerals. The census reports of 1900 give the total value of the mineral products of 1899 at $2,515,114. Some iron ore is produced but not in large quantities. The gold output was $1,715,762, and the silver $91,500. The value of the different mining-plants was $15,151,203, the expenditures aggregated $1,604,781, and the wages paid were $909,001. Rich deposits of lead, copper, cinnabar and coal are found in many portions of the state, and in Douglas County is the richest deposit of nickel thus far exposed in the United States. In Morrow County fine opals occur, and on the sea beach agates, jaspers, carnelians, jades and chalcedonies are found in abundance and of fine quality. East of the Cascades are large beds of handsome onyx-marble, and in the Siskiyou and Coast ranges are deposits of beautiful blue and gray sandstone, free in texture and of easy manipulation. Granite, marble and limestone abound in various places in great variety. Asbestos, paint-ore, fire-clay and mineral pigments exist in abundance, and are favorably situated for mining and shipment. One coal-mine in Coos County penetrates a huge bed of excellent bituminous coal, from which, from 1885 to 1900, more than 75,000 tons were annually sent to San Francisco. The coal yield (1900) was $260,917.

Forests. More than 25,000 square miles of the mountain and coast lands of Oregon are covered with a fine growth of timber, much of it yielding in sawn lumber from 50,000 to 200,000 feet per acre. Yellow fir is one of the strongest woods known, and is in demand for the ship-yards of France and other European countries. Many other varieties of fir and many kinds of spruce and pine abound, and cedar, oak and ash exist in vast unbroken forests.

Wealth. The total equalized value of assessable property in the state (with all exemptions deducted) was, in 1900, $120,000,000, on which a levy

of 5.16 mills for the taxes of 1901 was made. During the biennial term ending Dec. 31, 1900, the total receipts of the state treasury were $1,894,004, besides a balance from the previous year. The total disbursements for the term were $1,690,697, leaving



THE CAPITOL BUILDING, SALEM.

in the treasury at the beginning of 1901, $944,623. The public debt is practically nothing. Jan. 1, 1901, the total amount of the common-school fund amounted to $2,308,371.

The educational, charitable and penal institutions of Oregon embrace a school for mutes, one for the blind, an insane asylum, the Reform School and a State Penitentiary located at Salem. The latter institution had, Oct. 1, 1895, 326 inmates, for the maintenance of whom the state had appropriated for the succeeding two years $131,250. The State Insane Asylum had at the same time 970 inmates, and the expenses for the period mentioned amounted to $227,768. The inmates of the Reform School numbered 107; the expenditures were $122,115.

The authorized strength of the Oregon National Guard is 2,166. The actual force is composed of one brigade, made up of three regiments of two battalions of four companies each, a separate infantry battalion of two companies, two troops of cavalry and a battery of artillery, the total force numbering 1,469, officers and enlisted men. The state annually appropriates $30,000 for the Guard and the Federal government assists in the way of arms and munitions of war to the amount of from $3,000 to $5,000.

In 1899 newspapers were published in all of the 32 counties of Oregon, the total number in the state being 202, of which 20 were daily, 10 semiweekly, 150 weekly, 1 fortnightly, 1 semimonthly, and 20 monthly. The cities, towns, and villages in which papers were published numbered 82, of which 31 were county seats.

Education. The public-school system of Oregon is on a firm financial basis. The annual interest on the irreducible school fund is nearly $200,000. Besides this, amounts sufficient to maintain the free and normal schools and the State University are derived from taxation. In 1901 the value of the school property of the state was about $3,000,000; the number of children of school age, 135,818; of teachers employed, 3,000; of schoolhouses, 2,060; and the annual expenditures for school purposes approximated $1,160,000. The state normal schools are free to all who desire to become teachers in the public schools of the state. The higher institutions of learning are given in the table below:

Institution.	Location.	Religious Denomination.
Willamette Univ.	Salem	Methodist Episcopal.
Pacific Univ.	Forest Green	Nonsectarian.
McMinnville Coll.	McMinnville	Baptist.
Collegiate Inst.	Albany	Nonsectarian.
State University	Eugene City	Nonsectarian.
Corvallis Coll.	Corvallis	Nonsectarian.
Portland Univ.	University Park	Methodist Episcopal.
Philomath College	Philomath	United Brethren.
Pacific College	Newberg	Friends.
LaFayette Sem.	LaFayette	Evangelical Assoc'n.

Communications. The railroad mileage of Oregon in 1900 reached 1,695 miles. Seven distinct lines are operated, giving the state abundant transportation facilities by land, while many of the rivers of the western portion are navigable for steamers at all seasons of the year. Boats ply on the Columbia and the Willamette rivers and on some of their tributaries. The United States government has expended more than $2,000,000 in constructing locks at the Cascades, on the Columbia, 140 miles from the ocean, which, when completed, will allow uninterrupted navigation for 190 miles from the mouth of the river. The falls of the Willamette at Oregon City have had a canal with locks built around them by the state.

The following table of church statistics is taken from the census reports of 1890:

Denominations.	Organizations.	Meeting-places.	Members.	Value Church Property.
Roman Catholic	95	95	30,231	$290,090
Methodist Episcopal	203	201	9,436	614,625
Presbyt'r'ns in the United States of America	73	70	3,935	416,500
Disciples of Christ	74	42	4,067	76,700
Baptist	108	108	5,306	317,325
Methodist Episcopal S'th	70	62	1,936	50,850
United Brethren, Old Constitution	49	46	1,203	24,700
Protestant Episcopal	31	26	1,849	361,930
Congregational	35	38	2,037	160,200
Evangelical Association	25	24	1,199	63,900
Cumberland Presbyterian	23	21	897	22,200
Unitarian	5	5	890	139,500

The principal cities and towns of Oregon, with their population in 1900 are: Portland, 90,426; Astoria, 8,381; Albany, 3,149; Salem, 4,258; Oregon City, 3,494; Baker, 6,663; La Grande, 2,991; Pendleton, 4,406; Ashland, 2,634; Corvallis, 1,819; Roseburg, 1,690; Marshfield, 1,391; Grant's Pass, 2,290; McMinneville, 1,420; The Dalles City, 3,542.

State flower, Oregon Grape.

The following is a list of the governors of Oregon since the admission of the state into the Union: John Whiteaker, 1859–62; Addison C. Gibbs, 1862–66; George L. Woods, 1866–70; Lafayette Grover,

1870–77; S. F. Chadwick, 1877–78; W. W. Thayer, 1878–82; Zenas Ferry Moody, 1882–87; Sylvester Pennoyer, 1887–95; William Paine Lord, 1895–99; Theo. T. Geer, 1899–1903; G. E. Chamberlain, 1903.

See OREGON, Vol. XVII, pp. 845–849.

OREGON, a village, the capital of Ogle County, Illinois, 85 miles W. of Chicago and 25 miles S. of Rockford, on the Chicago, Burlington and Quincy railroad. It has water-power and manufactures of flour, pianos, and iron-castings, and is surrounded by a grain-raising district. Population, 1900, 1,577.

OREGON CITY, a city and the county seat of Clackamas County, Oregon, in the northwestern part of the state. It lies on the Willamette River, twenty miles above its junction with the Columbia River, and about 15 miles from Portland, and is reached by the Northern Pacific railroad. It has a large lumber trade and industries, and also flour and paper mills. Its population in 1900 was 3,494. W.F.J.

O'REILLY, ALEXANDER, soldier and statesman, was born in Ireland in 1725, and became a soldier in Spain, Italy, France, and Austria. In 1765 he saved the life of the King of Spain from a mob, and so ingratiated himself at court as to secure the appointment, in 1768, as governor of Louisiana, then a Spanish province. He assumed authority with a strong hand, banished or imprisoned all who resisted him, reorganized the government, and established a new and severe code of laws. In 1775 he led an unsuccessful Spanish expedition against Algiers, and afterward was commandant of Andalusia, and governor of Cadiz. He died in 1794. W.F.J.

O'REILLY, BERNARD, clergyman, was born in Ireland in 1803, came to America in 1825, and became a Roman Catholic priest in 1831. In 1832 he labored heroically for the relief of sufferers from the epidemic of cholera, and was himself twice stricken with that plague. In 1849 he was made bishop of the diocese of Hartford, Conn. In that office he built many churches, introduced the Sisters of Charity into the diocese, and founded many schools, asylums and other institutions. He did much to remove the antagonism which New England Puritans felt toward the Roman Catholic Church, and was personally esteemed by all who knew him, in the highest degree. In 1855 he went to Rome to secure additional aid for his work, in which mission he was successful. In January, 1856, he sailed for home, on the steamship *Pacific*, which was never heard from after leaving Liverpool. W.F.J.

O'REILLY, JOHN BOYLE, an Irish-American poet and journalist; born at Dowth Castle, County Meath, Ireland, June 28, 1844. He was educated at a public school, entered a printing office as an apprentice, and then became a reporter on a newspaper in Dublin. In 1862 he went to London as an agent of the Fenian Society, and in 1865 enlisted in the British army for the purpose of inducing Irish soldiers to revolt. He was detected in 1866, tried for high treason and sentenced to be shot; but the sentence was commuted to penal servitude for twenty years. From Dartmouth he was transported in 1867 to Australia, where in 1868, with the aid of the Rev. Patrick McCabe, he escaped in a boat, was rescued by the *Gazelle*, an American whaler, and carried to the United States. He landed in Philadelphia, where he was naturalized, and then removed to Boston, where in 1870 he became editor of *The Pilot*. He went to Canada as a reporter for *The Pilot* during the second Fenian raid, and for a time commanded the Irish forces. He was a prominent advocate of Home Rule for Ireland and was one of the leading American champions of the Irish cause. He wrote excellent verse, notably that on Australian themes. His published poems include *Songs of the Southern Seas and Other Poems* (1873); *Songs, Legends, and Ballads* (1878); *The Statues in the Block and Other Poems* (1881); *America* (1882), and *In Bohemia* (1886). Among his prose works are *Moondyne: A Story from the Under World* (1879); a tale of penal life, *The Irish Question* (1886); *The Ethics of Boxing and Manly Sport* (1888), and *Stories and Sketches* (1888). He was one of the founders of the Paygrus Club in Boston, and was one of the most popular of American journalists. He died in Hull, Massachusetts, August 10, 1890. A biography of O'Reilly was published in 1891 by James Jeffrey Roche, who succeeded him as editor of the *Pilot*. W.M.C.

JOHN BOYLE O'REILLY.

O'RELL, MAX. See BLOUET, PAUL, in these Supplements.

ORELLANA, FRANCISCO DE, a Spanish explorer; born in Truxillo, about 1490. He was a friend and lieutenant of Pizarro, and accompanied him to Peru in 1531. He took part in the conquest of Peru and in 1537 founded the city of Guayaquil. In 1540 he accompanied the expedition across the Andes in search of El Dorado, and sailed down the Napo River with a few men to the Amazon, which he followed to its mouth, and because of the stories he heard of women warriors, and women chiefs along its course, called it the Amazon. When he returned to Spain he told amazing stories of the richness of the country he had explored and received from the crown the right to establish a Spanish colony near the mouth of the Amazon. In 1544 he left Cadiz with a party of colonists, but the expedition proved unsuccessful. He died in Brazilian Guiana about 1555. His chaplain, Gasper de Caroajai, wrote an account of his travels, which was published in Seville; and later translated into English. W.M.C.

ORES. See MINING, Vol. XVI, pp. 460–462; and METALLURGY, Vol. XVI. pp. 62–68; see also articles on SILVER and GOLD, in these Supplements.

ORFA or URFAH, same as Edessa, Vol. VII, p. 566.

ORGANIC CHEMISTRY. See Chemistry, in these Supplements.

ORGAN MOUNTAINS. See Brazil, Vol. IV, p. 200; also New Mexico, Vol. XVII, p. 410.

ORGANOGENY. See Embryology, in these Supplements.

ORIBASIUS OF PERGAMUS, an early Byzantine physician. See Medicine, Vol. XV, p. 814.

ORIEL. See *Bay Window*, under Architecture, Vol. II, p. 404.

ORIENTAL RITE. See Roman Catholic Church, Vol. XX, pp. 646, 647.

ORIFLAMME, the battle-flag of France, adopted by Louis VI in 1124. See Flag, Vol. IX, p. 243.

ORIGINAL-PACKAGE LEGISLATION. See Liquor Laws, in these Supplements.

ORILLIA, a post village of Simcoe County, southern central Ontario, 86 miles N. of Toronto and about 25 miles N.E. of Barrie, the capital of the county, on Lake Couchiching near its junction with Lake Simcoe, and on the Grand Trunk railroad. It is situated in a district having large lumber and agricultural interests and producing large quantities of honey; has flour and saw mills, tanneries, foundries and carriage-shops, and is an important shipping-point for lumber and grain. It is popular as a summer resort, and is the seat of the Ontario Asylum for Idiots. Population 1901, 4,907.

ORKHAN, an early Turkish monarch. See Turkey, Vol. XXIII, p. 682.

ORLANDO, a city and the capital of Orange County, central eastern Florida, 35 miles W. of Titusville and 90 miles S. of Palatka, on the Florida Central and Peninsular and the Savannah, Florida and Western railroads; cultivates oranges, pineapples and vegetables; has large foundry and machine works and two state banks. Is a noted winter-resort. Population 1900, 2,481.

ORLEANS, Duc d'. See Paris, Comte de, in these Supplements.

ORLEANS, Maid of. See Joan of Arc, Vol. XIII, p. 706.

ORMEROD, Eleanor A., an English entomologist, the daughter of George Ormerod (1785–1873), the historian. She commenced her contributions to the science of entomology in 1868, in connection with the Bethnal Green Museum. In 1872 she represented Great Britain at the Moscow International Polytechnic Exhibition, and by her plaster models of plants and fruits, made by a process of her own, attracted general attention. She was elected a fellow of the Meteorological Society in 1878, the first woman elected to membership. She edited for the society the *Cobham Journals* (1880). In 1882 she was appointed consulting entomologist of the Royal Agricultural Society, and retained the post until 1892. She held a number of honorary positions. Her principal publications were *Manual of Injurious Insects* (1881); *Guide to Insect Life* (1884); and *Reports of Observations on Injurious Farm Insects* (1877–96). Died at St. Albans, July 19, 1901.

ORODUS, a genus of cestraciont sharks whose remains are found in carboniferous strata. The fossils consist largely of immense teeth, indicating a fish of great size.

ORONO, a town of Penobscot County, Maine, in the south-central part of the state. It lies on the Penobscot River, five miles north of Bangor, is reached by the Maine Central railroad, and has lumber and cotton mills and other industries, securing a superb water power from the river. It is the seat of the Maine State School (q. v.). Its population in 1900 was 3,257. W.F.J.

ORONSAY. See Colonsay, in these Supplements.

ORONTES, a river of Syria. See Syria, Vol. XXII, p. 860.

OROVILLE, a town and the capital of Butte County, northern central California, 28 miles N. of Marysville, and about 130 miles N.E. of San Francisco, on the Feather River, and on the Southern Pacific railroad. It is in a region producing oranges and other fruits, and has gold and silver mines in the vicinity. Pop. township (1900), 554.

ORRERY, an astronomical machine constructed for the purpose of representing the motions, and, approximately, the relative magnitudes and distances, of the planets. George Graham, about the year 1700, invented what is regarded as the first machine for this purpose. An instrument-maker named of Rowley obtained possession of Graham's machine, reproduced it, and sent it to the Earl of Orrery (see Charles Boyle, Vol. IV, p. 166), an amateur in mechanics. Sir Richard Steele, unacquainted with the name of the original inventor, called it in honor of the earl the *Orrery*, which name remained. A number of iron tubes, equal in number to the planets to be represented, of different dimensions, are arranged one within another. The innermost tube projects at each end beyond the one next to it, and that beyond the third, and so on. A rod is attached at right angles to one end of each tube. On the end of each of these rods there is a ball or lamp (to represent the planets). The lengths of these rods are also proportional, or supposedly so, to the radii of the orbits of the planets. The other ends of the tubes constitute axes for toothed wheels connected directly, or by combinations of other toothed wheels of the series, with a winch. The velocity of the revolutions of the rods, proportional to the times of the revolutions of the planets, is effected by a careful adjustment of the several combinations of wheels. On the top of the axis around which revolve the balls representing the planets when set in motion by turning the winch, is a large ball or lamp representing the sun, all the outer objects revolving around the central object at their proportional distances and velocities. The orrery superseded the planetarium constructed by Huyghens and Römer, which was popular in the seventeenth and eighteenth centuries, and was supplemented by the combined tellurian and lunarian, which showed the motion of

the moon around the earth, of the earth around the sun, with the several phenomena accompanying the progress of each. These devices are now regarded as toys and of no scientific value.

ORRVILLE, a village of Wayne County, Ohio, in the northeast-central part of the state. It is reached by the Cleveland, Akron and Columbus, Pittsburg, Fort Wayne and Chicago and Wheeling and Lake Erie railroads, and had in 1900 a population of 1,910. W.F.J.

ORSINI, a Roman faction. See ROME, Vol. XX, pp. 814–817.

ORSOVA, the name of two towns on the Danube, equidistant between the Iron Gates. OLD ORSOVA, a Hungarian place, is 478 miles S.E. of Vienna, and a short distance above the point where the river leaves the Hungarian territory. Population, 1,200.—NEW ORSOVA, on the Servian side, is situated on an island 3 miles below the former and 36 miles E. of Moldova. Population, 3,200.

ORTA, a town and small lake in the province of Novara, compartment of Piedmont, northwestern Italy, about 25 miles N.N.W. of Novara. The town is situated on a peninsula upon the east shore of Lake Orta, a small body of water having an elevation of 950 feet and draining through the Toce into Lake Maggiore. Population, 1,000.

ORTEGAL, CAPE, the most northerly point of land in Spain, in the province of Corunna, about 35 miles N.E. of the city of Corunna, extending into the Bay of Biscay.

ORTHAGORISCIDÆ. See SUN-FISH, Vol. XXII, p. 693; also OPAH, Vol. XVII, p. 798.

ORTHODOX. See QUAKERS, Vol. XX, p. 155; and FRIENDS, SOCIETY OF, in these Supplements.

ORTHOPÆDIC SURGERY. See *Deformities*, under SURGERY, Vol. XXII, pp. 727, 728.

ORTON, EDWARD, an American geologist; born in Deposit, N. Y., March 9, 1829. He graduated at Hamilton College in 1848. He was State geologist of Ohio from 1869 till his death; was president of Antioch College, Ohio, 1872–73, and of Ohio State University, 1873–81; and professor of geology in the same institution from 1873 till his death. He was president of the Geological Society of America in 1897, and of the American Association for the Advancement of Science, 1898–99. He died in Columbus, Ohio, Oct. 16, 1899. E.E.T.

ORTON, JAMES, naturalist, was born at Seneca Falls, N. Y., on April 21, 1830, and was graduated from Williams College in 1855 and from Andover Theological Seminary in 1858. He travelled in Europe, was a Congregational preacher from 1860 to 1866, became instructor in sciences at the University of Rochester, led an expedition of Williams College students across South America, became professor of natural history at Vassar College in 1869, led another South American expedition, and started on a third but was compelled to abandon it. He was the author of *The Andes and the Amazon*, *Underground Treasures*, and several other works. He died on September 25, 1877, on his third trip to South America, and was buried on an island in Lake Titicaca. W.F.J.

ORTONA, a town of eastern Italy, on the Adriatic Sea, and on the Western Adriatic railroad, 104 miles S.E. of Ancona and 12 miles E. of Chieti, in the compartment of Abruzzo and Molise. Population 1901 (estimated), 7,000.

ORTONVILLE, a city and the capital of Big Stone County, western Minnesota, at the southeastern extremity of Big Stone Lake, on the Chicago, Milwaukee and St. Paul railroad, 45 miles N.W. of Montevideo. It is situated in a fertile prairie country, producing wheat and live-stock. There are extensive granite quarries. Pop. 1900, 1,247.

ORTYGIA, an island. See SYRACUSE, Vol. XXII, pp. 852, 853.

OSAGE, a city and the county seat of Mitchell County, Iowa, in the eastern part of the northern tier. It is on the Red Cedar River, is reached by the Illinois Central railroad, and had in 1900 a population of 3,092. W.F.J.

OSAGE, a tribe of North American Indians who occupy a reservation of 1,500,000 acres in the northeastern portion of Indian Territory. They numbered in 1895, 1,657, of whom 758 were half-breeds. For tribal relations and descent, see INDIANS, Vol. XII, pp. 868, 871.

OSAGE CITY, a city of Osage County, Kansas, in the central-eastern part of that state. It lies on Salt Creek, thirty miles from Topeka, and is reached by the Atchison, Topeka and Santa Fé and Missouri Pacific railroads. Its population in 1900 was 2,792. W.F.J.

OSAGE MISSION, a village of southeastern Kansas, on the Neosho River, 35 miles S.W. of Fort Scott and about 15 miles W. of Girard, on the Missouri, Kansas and Texas railroad. Its postoffice designation is St. Paul. It is the seat of St. Ann's Academy for girls and St. Francis Institute for boys; is engaged in the shipping of grain, and has flour-mills and plow-works. Now St. Paul City. Pop. 1900, 1,047.

OSAGE ORANGE (*Maclura aurantiaca*), a tree of the family *Urticaceæ*, a native of North America. It attains a height varying from twenty to sixty feet. The wood, which is bright yellow, is fine-grained and very elastic, and takes a high polish. The tree is largely employed in America, especially in the West, as a hedge-plant.

OSAWATOMIE, a city of Miami Co., Kansas, on the Marais des Cygnes River, and on the Missouri Pacific railroad, seven miles S.W. of Paola and about fifty miles S.E. of Topeka. It is situated in a region producing grain, vegetables, butter and live-stock. One of the state insane asylums is located here. Pop. 1890, 2,662; 1900, 4,191.

OSBORNE, a city and the capital of Osborne Co., northwestern central Kansas, 34 miles W. of Beloit and about fifty miles N.E. of Hays City, on the South Fork of Solomon River, and on the Missouri Pacific railroad. It is situated in a rolling prairie country, producing grain, vegetables, broom-corn, sorghum, butter, wool, hay and live-stock. Pop. 1890, 1,174; 1900, 1,075.

OSCAR II, Frederic, King of Sweden and Norway; born in Stockholm, Jan. 21, 1829. After his education and foreign travels were completed, he succeeded to the throne on the death of his brother, Charles XV, Sept. 18, 1872. He reorganized the army and the railroads. In 1873 he visited Norwegian Lapland, and in 1875 the emperors of Germany and Russia. King Oscar published translations of Goethe's *Faust* and of *Tasso*, a sketch of Charles XII, and a volume of poems, published under the pseudonym of "Oscar Frederik." His collected writings appeared in four volumes, 1875–91; and a fifth volume, containing his speeches, appeared in 1894.

OSCAR II.

OSCEOLA, a city and the capital of Clark Co., Iowa, about 45 miles S.S.W. of Des Moines, near the Chariton River, on the Chicago, Burlington and Quincy and the Des Moines and Kansas City railroads. The surrounding region is devoted to agriculture and stock-raising. The machine-shops of the Des Moines and Kansas City railroad are located here. Pop. 1890, 2,120; 1900, 2,505.

OSCEOLA, a post village and the capital of St. Clair Co., Missouri, on the right bank of the navigable Osage River, and on the Kansas City, Fort Scott and Memphis and the Kansas City, Osceola and Southern railroads, about 60 miles S.S.W. of Sedalia and about 85 miles S.E. of Kansas City. It is an important shipping-point for grain and live-stock, and large stone-quarries are in the vicinity. Pop. 1890, 995; 1900, 1,037.

OSCEOLA, a post village and the capital of Polk Co., Nebraska, about 100 miles W.S.W. of Omaha and about 56 miles N.W. of Lincoln, on the Union Pacific railroad. It is situated in a level prairie region, producing wheat, corn, oats, hay and live-stock. Pop. 1890, 947; 1900, 882.

OSCEOLA, a Seminole Indian chief; born in Florida about 1803. He was the son of an English trader named Powell, and of the daughter of a Seminole chief. His wife (the daughter of a fugitive slave woman) was claimed as a slave by the owner of her mother, and was carried off as such. Osceola protesting, he was arrested and ironed by Gen. Thompson, the Indian agent at Fort King, but was released after six days' imprisonment. He then lay in wait for Gen. Thompson, and on Dec. 28, 1835, he killed him and four other white men, thus commencing the second Seminole war. Osceola took command of a band of Indians and fugitive slaves who on the same day had massacred Major Dade and 110 soldiers. For upward of a year he conducted the struggle against superior forces with energy and skill; but on Oct. 23, 1837, while holding a conference under a flag of truce with Gen. Jesup near St. Augustine, he was treacherously seized and imprisoned at Fort Moultrie till his death, Jan. 1, 1838. E.E.T.

OSCEOLA MILLS, a borough of Clearfield Co., Penn., on Mushannon Creek, and on the Pennsylvania railroad and the Altoona and Phillipsburg connecting line, about 30 miles N. of Altoona and 21 miles S. of Clearfield. It is situated in a coal region, and contains foundries, a tannery, lumber-mills and a machine-shop. In 1875 the greater part of Osceola was destroyed by fire. Population 1900, 2,030.

OSCILLATOR, Nikola Tesla's. The oscillating engine of Nikola Tesla occupies a position midway between the steam-engine and the electric dynamo. It is virtually a steam-chest set upright and disassociated from the usual mechanism that accompanies it in the steam-engine, but arranged to carry reciprocating armatures on its pistons. The steam-chest is run at a very high pressure, 350 pounds to the square inch, and no packing is used, the inventor having devised a means of operating without it. Opposite the steam-chest is an electro-magnetic coil, into whose field of force the piston is alternately thrust and withdrawn, thus setting up electric currents, as in an engine-driven dynamo. This is the form that was exhibited at the Columbian Exposition in Chicago, but Mr. Tesla built some six or eight other experimental forms previous to the destruction of his New York laboratory fire in 1895. The latest and best of these was a double machine, made horizontal, and arranged all on one base-plate. The steam-chest is single, but has two pistons, which reciprocate oppositely at a speed of eighty to one hundred times a second. The armatures on the pistons are plunged at every stroke into the fields of the two electro-magnetic generating systems, which constitute the dynamos of the machine. On top of the steam-chest, which is located centrally between the dynamos, is a miniature oscillator, arranged to serve as a governor, by controlling the admission of steam, and making the vibration of the engine independent of its load.

The advantages of the oscillator, as compared with a direct-connected steam-engine and dynamo, are a reduction in friction, consequent on the material reduction in the number of parts; a reduction in wear, due to few parts, and the absence of crank-motion; also the ease and simplicity with which it is regulated and maintained at an even speed. It accomplishes the end of converting the pressure of steam into electric energy in a much more direct manner than was before possible, and for this reason, and because of the eminent character of the inventor, engineers expect a great future for the oscillator. Its practical work, however, at this date has been confined to electric lighting, and that of a rather experimental character. It is primarily designed for use in electric-lighting plants, though it has a future of promise in steamboat navigation and railway locomotion.

C. H. Cochrane.

OSCILLATORY DISCHARGE. See Electricity, § 92, in these Supplements.

OSCINES, a suborder of *Passeres*, including the birds with highly developed singing apparatus.

OSCODA, a village of Iosco County, in the northeastern part of the southern peninsula of Michigan, 70 miles N. of Bay City, on Lake Huron, at the mouth of Au Sable River, and on the Au Sable and Northwestern and the Detroit and Mackinac railroads. It has a large trade in lumber, and contains saw and planing mills, a foundry and extensive salt-works. Pop. 1890, 3,593; 1900, 1,109.

OSCOTT, a Roman Catholic College, in the village of that name in the parish of Handsworth, Staffordshire, four miles N. of Birmingham, England. The name is first met with toward the close of the seventeenth century as the seat of a Catholic mission, which continued to be served by different priests till, in 1752, it was formed into a college for the education of both laymen and ecclesiastics, and called St. Mary's College. In 1835 the present buildings were erected from the designs of Pugin, at a cost of $300,000. The buildings are arranged in the form of a cross. In 1889 the establishment became purely ecclesiastical, no longer admitting lay students. The college is presided over by a rector, has a vice-rector and a staff of eight professors, and is open to students from any British diocese.

OSCULATING CURVES. See INFINITESIMAL CALCULUS, Vol. XIII, p. 29.

OSCULATING PLANE. See MECHANICS, Vol. XV, p. 686.

OSGOOD, FRANCES SARGENT, an American poet; born in Boston, Mass., June 18, 1811. She contributed poems to Lydia M. Child's *Juvenile Miscellany;* in 1835 married S. S. Osgood, a painter; lived for five years in London, where she wrote for magazines and published *The Casket of Fate* and *A Wreath of Wild Flowers from New England;* and settled in New York, where she edited *The Poetry of Flowers, and Flowers of Poetry*, and *The Floral Offering.* She died in Hingham, Mass., May 12, 1850. E.E.T.

OSHAWA, Canada, a town of Ontario County, Ontario, 34 miles by rail N.E. of Toronto, a short distance inland, but with a good lake harbor and trade. Population, 1901, 4,394. C.L.S.

O'SHEA–PARNELL SCANDAL. See HOME RULE, in these Supplements.

OSHKOSH, a city of Wisconsin. In 1900 there were three railroads entering the city: the Chicago and North-Western, the Chicago, Milwaukee and St. Paul and the Wisconsin Central. The census returns for the year 1900 showed a total in the city of 285 manufacturing establishments, representing 31 chief industries, with a combined capital of $8,018,038, employing 4,587 persons, to whom was paid $1,762,410 in wages, and turning out products valued at $8,781,248. The principal industries are flour, saw and planing-mills, carriage and furniture factories, machine-shops, foundries, match factories, vinegar-works, breweries, slaughtering and meat-packing.

The banks of the city, state and national, had in 1900 a combined capital of $1,250,000, and in 1899 the assessed valuation of property in Oshkosh was $10,580,497. The city has a large shipping trade by lake and river, the chief articles of shipment being flour and lumber, and within recent years it has become popular as a summer-resort. Population 1890, 22,836; 1900, 28,284. See OSHKOSH, Vol. XVIII, p. 58.

OSKALOOSA, a city and the county seat of Mahaska County, Iowa, in the southeastern part of the state. It lies in an agricultural and mineral region, between the South Skunk and the Des Moines rivers, fifty miles east by south from Des Moines, and is the seat of several educational institutions and of numerous and varied industries. The latter include coal mines and breakers, rolling mills, brick and tile kilns, and machine shops. Among its schools and colleges is Penn College, one of the chief Quaker institutions of the west, which was founded in 1873, and in 1904 had 15 instructors, 366 students, and a library of 5,000 volumes. Oskaloosa is reached by the Iowa Central and the Chicago, Rock Island and Pacific railroads, and had in 1900 a population of 9,212. See also in Vol. XVIII, p. 59. W.F.J.

OSKALOOSA, a city and the capital of Jefferson County, northeastern Kansas, 25 miles N.E. of Topeka, and about 20 miles W.S.W. of Leavenworth, on the Kansas City Northwestern and the Leavenworth, Topeka and Southwestern railroads. It is in a grain, stock and fruit-raising district. Population 1890, 773; 1900, 978.

OSMAN, NUBAR PASHA, a Turkish general; born in Tokat, in Asia Minor, in 1832. After his military education at Constantinople was finished, he entered the cavalry in 1854 and served under Omar Pasha. In 1876 he was commandant at Widdin during the Turko-Servian War, and for his valorous conduct at Saitschar was promoted from general to field-marshal. After the Russians had crossed the Danube in 1877, Osman Pasha repulsed their ninth corps with terrible slaughter at Plevna, July 24 and 31, and then thoroughly fortified that city. On September 14 he repulsed the Russian besiegers, with a loss of 2,000 men. On December 10 he made a gallant but unsuccessful attempt to break through the Russian lines. Being wounded, he was compelled to capitulate, surrendering 40,000 men and 400 cannon. His sword was returned to him by the Czar, and he was treated with the greatest courtesy by his conquerors. In 1878 he became commander-in-chief of the Imperial Guard, governor-general of Crete, and Minister of War. In 1894 he became Grand Marshal of the Palace. He died at Constantinople, April 4, 1900.

OSMAN ALI, commonly called OSMAN DIGNA, the leader of the Soudanese dervishes, was born at Suakim about 1836, his grandfather being a Turkish slave-dealer, who married a woman of the Hadendowa tribe. Osman followed the trade of his grandfather and father, dealt in slaves, having agents at Khartoum and Berber, the latter place latterly being his headquarters. He entered into communication with the Mahdi, Mohammed Ahmed, and brought the various tribes into a union for the purpose of raising the standard of revolt against the Khedive. He became the military head of the dervishes. The rebellion of "the false prophet" broke out on the White Nile in Decem-

ber, 1881. On Aug. 3, 1883, Osman was defeated before Suakim by Tewfik Bey. Again in September, 1885, an Abyssinian expedition under Ras Alula, which had been sent to the relief of Kassala, met Osman and utterly routed him. On Dec. 21, 1888, he was overcome at Suakim by Gen. Sir F. Grenfell; on Feb. 21, 1891, he was defeated and fled precipitately without having taken a direct or personal part in the fight, at Handoub. On March 7 the sheiks assembled at Suakim to hear the amnesty proclamation of the Khedive read by General Grenfell. In 1893 Osman Digna moved his headquarters to Amet, about 80 miles S.E. of Suakim. In April, 1894, he made another incursion towards Tokar, but was driven off by the Egyptian cavalry. For the operations against the dervishes in 1896, see EGYPT, in these Supplements.

OSMIUM. See CHEMISTRY, Vol. V, pp. 465–466.

OSMOSE, the inter-diffusion of two liquids through a septum, usually of bladder or of parchment-paper. If a bottle, filled with one liquid, be closed by parchment-paper, and be completely immersed in a vessel containing another liquid, increase or decrease of the contents of the bottle will occur according as the liquid contained in the bottle passes out through the septum less quickly or more quickly than the other liquor passes inward. When the contents are increased the phenomenon has been called *endosmose*, when they decrease it has been termed *exosmose*.

OSSETES, LANGUAGE OF. See PERSIA, Vol. XVIII, p. 668.

OSSIPEE, a township and village, the capital of Carroll Co., N. H., 40 miles N.N.E. of Concord, in a mountainous district covered with heavy forests, whence its sawmills are supplied with logs. Pop. 1900, 1,479.

OSTEOBLASTS. See ANATOMY, Vol. I, p. 751.

OSTEOGLOSSIDÆ, a family of *Physostomi*. See ICHTHYOLOGY, Vol. XII, p. 732.

OSTEOLEPIS, a genus of fossil ganoid fish peculiar to the Old Red Sandstone. It is characterized by smooth rhomboidal scales, by numerous sharply-pointed teeth, and by having the two dorsal and anal fins alternating with each other.

OSTEOLOGY. See ANATOMY, Vol. I, p. 719.

OSTEOPATHY is a system of treating disease without drugs, by the use of the hands, to adjust all parts of the human mechanism to perfect mechanical relations. It is that science which finds in disturbed mechanical relations of the anatomical parts of the body the causes of disease, and which is employed to cure disease by applying technical knowledge and high manual skill to the correction of all disturbed relations occurring in the mechanical arrangement of the body. It is a science founded upon the principles of anatomy and physiology. The word does not mean the treatment of the bones, nor of bone diseases. It was used as a name because the founder discovered the importance of disturbances in the bony frame-work of the body in causing disease. He studied the skeleton as the foundation of anatomy, upon which science he grounded his system. The meaning of the word applies not only to derangements of bony parts, but as well to disturbed relations of ligaments, tendons, blood-vessels, muscles, nerves, and of any body-tissue.

The technical training of the Osteopath enables him to detect such mechanical faults in all parts of the body. He recognizes the disease by the symptoms manifested by it, but interprets these symptoms by tracing them to their real causes in the mechanical disturbances which produce them. Here lies one radical difference between Osteopathy and medicine. The diagnosis of the disease does not stop with naming the symptom group of a certain disease; it goes further, to diagnose the actual physical disturbances causing the disease.

Another radical difference is found in the method of treatment. The Osteopath rights what is radically wrong and leaves Nature free to act. It is clear that he thus reaches the specific cause. His remedy is applied, not to overcoming the symptoms, but to eradicating the cause. The human system is a perfect mechanism, and it must be in perfect mechanical order that it may perform its various functions aright.

The course of study embraces all the branches taught in Schools of Medicine, except that of drug-therapy.

The practice of Osteopathy rests upon the assumption that disturbed function is largely dependent upon disturbed structure and will be permanently corrected only by the adjustment of that disturbed structure. When that is accomplished the inherent recuperative powers of the organism manifest themselves in a rapid mechanic, chemic, and physiologic regeneration, sufficient to restore to every organ its normal function. It is assumed that so long as every organ receives its normal amount of blood, lymph, nerve force, or other vital fluid, and so long as it is properly drained of the waste products of metabolism, health must follow as a logical necessity; and that whenever an organ fails in the performance of its function, that fact is *prima facie* evidence of some obstruction to the incoming or outgoing forces. In the case of an organ whose arterial channels are obstructed, that organ must of necessity suffer from the effects of a local anemia; if an obstruction to its venous drainage be present, the ill-effects of a passive congestion are inevitable; if its channel for the propagation of nerve impulses is infringed upon, disturbance of the power of the organ must manifest itself. Hence, disease is looked upon as a condition of an organ or of the organism in which function or activity cannot properly obtain because of some interference with one or more of these various pathways. The structures which produce the obstruction may be any of the tissues of the body, but are found to be principally luxated bones, contractured muscles, and strained or overgrown ligamentous or connective tissue material. With this proposition in view the Osteopathic diagnostitian is not content with a diagnosis of the location and condition of the diseased organ, which he recognizes as important enough, but by methods pecu-

liar to his system he also attempts to locate the disordered structural condition which is at fault in the production of the perverted function. Having by these methods determined the abnormal structural condition present, he limits his field of operations to the reduction of such structural condition, as far as may be done, or attempts by his special manipulative measures to render to the organism such aid as will enable it to overcome or adapt itself to the changed structure. In his manipulation, he does not depend alone upon his ability to force a mechanically abnormal part back into place, but depends also upon the fundamental principle that as soon as structural parts are dislodged from their false positions and relations, the normal tension of immediately adjacent and related parts will tend to restore the conditions of mechanical integrity. Hence is formulated the foundation proposition that Nature constantly tends toward a normal condition, both of structure and function, and the province of the physician is not in seeking a healing power from without, but in assisting the organism to maintain its structural integrity, which animated by the vital principle is sufficient of itself to generate and distribute every element necessary to normal functioning. From an Osteopathic standpoint, disease is the result of physiological discord. With this fact established in the mind of the doctor of Osteopathy as a truth, he is warranted, then, in hunting the facts that would prove the position, that disease is the result of physiological discord in the functioning of the organs or parts of the physiological laboratory of life. Thus, as an explorer or seeker of the cause of disease, he would naturally reason that the variations from the physiological perfection would naturally be found in disordered nerve connections, to the degree of breaking or shutting off the normal circuit of nerve force from the brain to any part of the body that should be sustained by that force when normally conducted to any organ as the power necessary to its process of vital functioning. If this be true, there is nothing left in his procedure but to find the break or obstruction to the natural passage of blood or any other fluid that is necessary to a normal condition, which is health itself. Thus, the physician of any school of the healing art must know and act upon the philosophy that disease is the result of physiological discord. The cause of disease can be traced to bony variations, from the base of the skull to the sole of the foot, in the joints of the cervical, dorsal, and lumbar vertebræ, the articulations with the sacrum, also in the arms and lower limbs. Strains by lifting, jolts, jars, falls, or anything that would occasion any organ of the chest or abdomen to be moved from its normal to an abnormal position, are causes sufficient to confound the harmony of natural functioning of the whole viscera, both above and below the diaphragm, and be the cause of an unhealthy supply of nerve fluid and force for the limbs and the organs of the body, internal and external, the brain included. In the foregoing, we have given what we consider a short and philosophical definition of what is meant by the word Osteopathy. We use the bones as fulcrums and levers to adjust from the abnormal to the normal, that the harmonious functioning of the viscera of the whole body may show forth perfection, or that condition which is known as "good health."

The science was founded by Dr. Andrew Taylor Still at Baldwin, Kansas, in 1874. He is now the President of the American School of Osteopathy, at Kirksville, Mo., the original school of the science.

A. T. STILL.

OSTERODE, a town of Hanover, western Prussia, at the western base of the Harz Mountains, 30 miles N.W. of Nordhausen and 18 miles N.E. of Göttingen. Population, 6,705.

OSTHOFF, HERMANN, a German philologist; born in Billmerich, Westphalia, April 18, 1847; left the gymnasium of Una to enter the University of Bonn; continued his studies at Tübingen and Berlin; became teacher in the gymnasium of Cassel (1871–74); private docent in Leipsic (1875–77); professor of comparative philology in the University of Heidelberg (1877). He was one of the foremost students of Indo-European grammar and philology, etc.

OSTRACODA, an order of CRUSTACEA, Vol. VI, p. 587.

OSTREA. See OYSTER, Vol. XVIII, p. 110.

OSTROG, a town in Volhynia, Russia, about 170 miles W. of Kiev. It consists of an old and new town, and has an ancient castle. In the reign of Constantine of Ostrog the first Slavonic Bible was printed here, in 1558. Pop., 1895, 16,522.

OSTROLENKA OR OSTROLEKA, Russia, a town and railway junction in the Polish government of Lomza, near the Prussian boundary, on the Narew tributary of the Vistula, 20 miles west of Lomza, and 80 miles northeast of Warsaw. On the sandy plain and in the woods in the neighborhood was fought the battle of Feb. 16, 1807, when the French defeated the Russians. On May 26, 1831, it was again the scene of a sanguinary conflict, when the Russians under Diebitsch defeated the Poles under Skrzynecki, but were too exhausted to follow up their advantage. Population, 6,000. C.L.S.

OSTROVSKY, ALEXANDER NIKOLAIEVICH, a Russian dramatist; born in Moscow, April 12, 1823. He first became known in 1849 by his successful comedy, *We Get on with Our Own Kind*. His subsequent works were *The Poor Bride* (1852); *Poverty Is Not a Fault* (1853); *A Profitable Place* (1857); *The Storm* (1859), and *A Warm Heart* (1869). He was the author of several translations, including one of *The Taming of the Shrew*. His complete works were published in St. Petersburg (1887). He died in Moscow, Russia, June 14, 1886. W.M.C.

OSTROWSKI, COUNT ANTONIO JOANNES, a Russian soldier; born in Warsaw, May 27, 1782. He joined the French Body Guard in 1806 and was attached to Napoleon's army. He was a leader in the revolution of 1830 and wrote the manifesto issued by the Polish army to the European nations. He died in Tours, France, in 1846. W.M.C.

OSTROWSKI, Count Tomasz Adam Rawich, a Russian nobleman; the last of the Polish nobles of the palatinate of Lublin; born in Ostrow, Lomza, December 21, 1739. The king of Poland appointed him minister of finance, after the establishment of the constitution of 1791, but in the following year he resigned and joined with the other nobles for the overthrow of the constitution. In 1795 he retired from public life to his estates in Ukraine, where he died February 5, 1817. W.M.C.

OSWALD, Felix Leopold, an American traveler and author; born in Namur, Belgium, in 1845; graduated at Liège in 1864; educated as a physician, but became attracted to natural history; removed to the United States, settling in Tennessee, and traveled in Mexico.

OSWEGATCHIE RIVER, 130 miles long; rises in Herkimer Co., N. Y., flows into Cranberry Lake, then westerly, then northeast, then northwest, and joins the St. Lawrence near Ogdensburg.

OSWEGO, the seat of Labette County, Kansas, in the southeastern part of the state, is reached by the Missouri, Kansas and Texas and the St. Louis and San Francisco railroads. Its population in 1900 was 2,208. W.F.J.

OSWEGO, a city and port of entry of New York. Pop. 1900, 22,199. See Oswego, XVIII, p. 67.

OSWEGO FALLS, a village of Oswego Co., N. Y., on the Oswego river and canal, opposite Fulton, with which it is connected by two iron bridges; has lumber, woolen, paper, and pulp mills. Pop. 1900, 2,925.

OSYMANDYAS, an ancient Egyptian king. See Libraries, Vol. XIV, p. 509.

OTAGO (Maori *Otakou*, "red earth"), the most southern provincial district of New Zealand, in South Island; colonized in 1848 by the Otago Association, connected with the Free Church of Scotland. It has a coast-line of 600 miles, and is 160 miles long by 195 broad. The eastern and central portions are partly forest and partly pasture and arable land; the western part is mountainous, and contains stone and slate. Gold was discovered here in 1861, and now the gold-fields comprise an area of 4,000 sq. miles, from which gold to the value of $90,000,000 had been exported up to 1888. Dunedin is the capital. Area, 25,487 sq. miles; population 1901, 173,145.

OTARIIDÆ. See Mammalia, Vol. XV, p. 449.

OTCHAKOF, a seaport in Kherson government, Russia, 38 miles N.E. of Odessa, on the site of the ancient *Alector*, and beside the ruins of the once important Greek colony of Olbia. In 1492 the Khan of the Crimea built here a strong fortress, which was taken by the Russians under Münnich in 1737, recovered in 1738, and again captured after a long siege by Potemkin in 1788, and annexed by Russia. After it had been bombarded by the allied fleet in 1855, the Russians demolished the fortifications. In 1887 a ship canal was opened here, which makes the estuary of the Bug and Dnieper much more accessible to large ships. The population, mostly Jews, engaged in the fishing-trade, is 8,032.

OTHMAN. See Osman, Vol. XVIII, p. 59.

OTHO OF BAVARIA, King of Greece. See Greece, Vol. XI, p. 112.

OTIS, Elwell Stephen, soldier, was born at Frederick City, Md., on March 25, 1838, and was graduated from the University of Rochester in 1858 and from the Harvard Law School in 1861. He entered the army in 1862 as a captain of volunteers, and was present in all the battles of the Army of the Potomac from Antietam until October, 1864, when he was seriously wounded. He served with distinction at Gettysburg, in the Wilderness, at Spottsylvania, and at Petersburg. After the war he was engaged on the frontier, and took a leading part in avenging the Custer massacre and reducing the Sioux to order and submission. At the outbreak of the Spanish War he was engaged as president of a court martial in trying an important case, and thus was unable to go to the front at once. Toward the end of the war, however, he was sent to Manila, and performed the duties of military governor of the Philippines for nearly two years. His labors there were of the most arduous description. He had to deal with the insurrection of Aguinaldo as well as to organize a govermental system for the archipelago. The government at Washington gave him a free hand, and the results were on the whole satisfactory. He was relieved of his duties in the Philippines on May 5, 1900, and on his return to the United States was put in command of the Department of the Lakes, at Chicago, and afterward, temporarily, of the Department of Dakota. On March 25, 1902, he was honorably retired with the rank of major-general. W.F.J.

ELWELL S. OTIS.

OTIS, Harrison Gray, soldier and journalist, was born in Ohio on February 10, 1837, served throughout the Civil War, was a brigadier-general in the Spanish War and in the Philippines, and was brevetted major-general. He has for many years been editor of the *Times* at Los Angeles, Cal. W.F.J.

OTOMIS or OTHOMIS, a tribe of Mexican Indians. See Indians, Vol. XII, p. 868.

OTRANTO. See Fouché, Vol. IX, p. 420.

OTSEGO, a village of Allegan Co., Mich., on the Kalamazoo river, 43 miles S. of Grand Rapids, in the celebrated fruit-growing region of Michigan; has good water-power, paper-mills, iron-works, corn-cutter, chair, and sash factories, and lumber and saw-mills. There are magnetic springs in the vicinity. Population 1890, 1,626; 1900, 2,073.

OTTAWA, one of the largest rivers of Canada, rises nearly 300 miles due N. of Ottawa City, in lat. 48° 30′ N., in the watershed on the opposite side of which rise the St. Maurice and Saguenay; flows west to Lake Temiscaming, some 300 miles, thence 400 miles southeast, and falls into the St. Lawrence by two mouths, which form the island of Montreal; drainage area 60,000 to 80,000 sq. miles; volume 90,000 cubic feet per second; sometimes contracts to forty or fifty yards, elsewhere widens into lakes of considerable size; chief affluents the Gatineau.

Lièvre, and Rouge. These with the Ottawa itself give transit for the largest lumber trade in the world. The river has several falls and rapids, the best known being the Carillon Falls, a series 12 miles in length above Rigaud; the Chaudière Falls, at the city of Ottawa; and, 30 miles further up the river, Les Chats, a striking series of rapids. The river is connected with Lake Ontario by a canal from Rideau to Kingston.

OTTAWA, capital of the Canadian Dominion, is situated 90 miles up the Ottawa River and from its confluence with the St. Lawrence, between the Chaudière and the Rideau Falls. Here are the parliament buildings, the governor-general's residence, a Roman Catholic cathedral, numerous schools and colleges, and the Parliamentary Library. The city was in 1856 selected by Queen Victoria as the capital of the Dominion, and in 1866 occurred the first assembling of the Dominion Parliament in the new buildings constructed for its use. The sawed lumber trade is the chief industry, the capacity of the mills of the city being over two hundred million feet for the season. There is also considerable flour milling. The city's assessed valuation was in 1895 over twenty million dollars. Branches of the principal chartered banks of the country, with a combined capital of nearly $40,000,000, are situated at Ottawa. Population (1901 census) was 59,928. The city and the adjacent village of Hull, across the Ottawa River, was, in April 26, 1900, visited by a most destructive and calamitous fire. Feeding largely on the lumber piles and wooden buildings in Hull, and fanned by a strong northerly wind, the devouring elements leapt across the suspension bridge and burned a large section of the capital. The estimated loss was $15,000,000. See Ottawa, Vol. XVIII. p. 71.

OTTAWA, a city, capital of Lasalle Co., Ill., on the Illinois River, at the mouth of the Fox River, on the Illinois and Michigan canal, and on the Chicago, Burlington and Quincy, and Chicago, Rock Island and Pacific railroads; has a large number of structures of architectural excellence, including a county court-house, a high-school building, the Reddick Library, churches, and two national banks. Besides a fine system of public schools, the city is the seat of St. Francis Xavier Academy. Its manufacturing plants include cutlery, tile, and glass works, flouring and planing mills, starch, glass, agricultural-implement, and other industries of a substantial character. It is lighted by gas and electricity, has an electric street-railway, and has an abundant water-supply from artesian wells and other sources. Population 1890, 9,985; 1900, 10,588. See also Ottawa, Vol. XVIII, p. 72.

OTTAWA, a city and the county seat of Franklin County, Kansas, in the central-eastern part of the state. It lies on the historic Marais des Cygnes River, 35 miles southeast of Topeka, and is reached by the Missouri Pacific and the Atchison, Topeka and Santa Fé railroads. It is the seat of Ottawa University, a co-educational Baptist institution founded in 1865, and has extensive coal, iron, timber and other industries. Its population in 1900 was 6,934. W.F.J.

OTTAWA, a village, the capital of Putnam Co., Ohio, on the Blanchard River, a tributary of the Auglaize, 20 miles N. of Lima, and on the Cincinnati, Hamilton and Dayton, and the Findlay, Fort Wayne and Western railroads; has factories of spokes, hubs, sashes, and blinds, and is the centre of a grazing and agricultural district producing corn and small grains, pork, and live-stock. Population 1890, 1,717; 1900, 2,322.

OTTAWAS. See Indians, Vol. XII, p. 871.

OTTENDORFER, Oswald, an American journalist; born in Zwittau, Moravia, Feb. 26, 1826. He was educated in the universities of Vienna and of Prague, and studied law. He was active in several revolutions in 1848 and 1849; served in the Schleswig-Holstein war against Denmark; and came to America in 1850. He secured employment in the office of the New York *Staats Zeitung*, and in 1859 married the widow of his former employer. He was an alderman in New York in 1872–74; and was an anti-Tammany reform Democrat. He founded the Ottendorfer Free Library in New York, in which city he died. Dec. 15, 1900. E.E.T.

OTTERBEIN UNIVERSITY, situated in Westerville, Ohio, was organized in 1847, named in honor of Bishop Philip William Otterbein, founder of the Church of the United Brethren in Christ, and opened under the presidency of W. R. Griffith, with 81 students of both sexes. It was chartered in 1849, with university privileges. The main college building was erected in 1871, to replace the former, destroyed by fire the previous year. The other buildings are Saum Hall, a Conservatory of Music, and a new Christian Association building. The courses include the classical and the philosophical; the faculty consists of 20 instructors, and the number of students in 1901 was 316. There is a preparatory course of three years, post-graduate courses, and normal, art, and music departments. The productive funds amount to $70,000, and the total income to $15,000 annually. The library has 10,000 volumes.

OTTER CREEK, rises in the northern part of Bennington Co., Vt., and after flowing in a generally northerly direction through Rutland and Addison counties, empties into Lake Champlain at Ferrisburg. It is about 90 miles long, is navigable for eight miles from its mouth, and furnishes water-power for the towns situated on it, including Rutland, Middlebury, and Vergennes.

OTTERY ST. MARY, a town of England, on the river Otter, and on the London and Southwestern railroad, 11 miles E. of Exeter, and 5 miles S.W. of Honiton. Twice the scene of a great conflagration, in 1767 and 1866, it retains its magnificent collegiate church, a reduced copy of the cathedral of Exeter, with the only other transeptal towers in England. The town has factories of silk, shoe-laces, handkerchiefs, and Honiton lace, and is celebrated as the birthplace of the poet Coleridge. Population 1901, 5,000.

OTTO, King of Bavaria. See Bavaria, in these Supplements.

OTTUMWA, a city, capital of Wapello Co., Iowa. Since 1880 its growth has been rapid. There are 6 rail-

roads entering a general passenger depot, erected at a cost of $125,000. The water-power has been developed until it is claimed to be the finest in the state. The various industries include iron-works and ruffler company, employing 500 men, machine, cutlery and stove works, linseed-oil, starch and flour mills, cigar factories, and a pork-packing establishment with a capacity of 5,000 hogs daily. These industries employ 3,000 men and have a capital of $1,500,000. The city has many fine buildings, paved and graded streets, water-works, a good sewerage system, a fire department, gas and electric lights, several miles of electric street-railways, good public schools, 15 churches, normal school, business college and Roman Catholic Academy, state and national banks, with a combined capital of $670,000, 3 daily and 8 weekly papers and a monthly periodical. Population 1890, 14,001; 1900, 18,197. See also Ottumwa, Vol. XVIII, 73.

OUDE. See Oudh, Vol. XVIII, pp. 74–76.

OUIDA, novelist. See De la Ramée, Louisa, in these Supplements.

OULACHAN or EULACHON, a fish of the smelt family found along the northern Pacific coast of North America. Its scientific name is *Thaleichthys pacificus*. The flesh is very oily, and from it large quantities of oil are extracted. It is called the candle-fish because it burns easily when dried. It is a finely flavored food-fish.

OULESS, Walter William, an English artist; born in Jersey, September 21, 1848. He received an academic education at Victoria College; studied painting at the Royal Academy School and for many years exhibited at Burlington House. He began his career as a painter of genre and historical pictures, but it is as a portrait painter that he has chiefly distinguished himself. He was elected an associate of the academy in 1877, and a full academician four years later. He has painted portraits of Charles Darwin, John Morley, Lord Selborne, Cardinal Newman and other celebrated persons. His only historical pieces of note are *Home Again* and *An Incident in the French Revolution*. Ouless is best known by his portrait of *Charles Darwin*, an etching by Rajon, having had wide circulation in the United States and Europe. W.M.C.

OURAY, a city and the capital of Ouray County, southwestern Colorado, about 15 miles N. of Silverton, at the base of Mount Hayden, on the Denver and Rio Grande railroad. It is situated in a rich mineral region, producing gold and silver abundantly, also copper and galena, and containing iron and sulphur springs. The surrounding scenery is noted for its grandeur and beauty. The city has lumber-mills and smelting-works. Population 1890, 2,534; 1900, 2,196. This section of the state was explored by the Georgians under Baker, who was killed by the Indians, on the Colorado River.

OURO PRETO, a Brazilian city. Population in 1890, 59,249. See Ouro Preto, Vol. XVIII, p. 78.

OUSE, a river of Yorkshire, England, formed near Boroughbridge by the union of the Ure and Swale; flows in a southeasterly direction, and after a course of about fifty-seven miles it joins with the Trent to form the estuary of the Humber. Among the larger tributaries of the Ouse are the Wharfe, the Aire and the Don. The river is navigable for vessels of the largest size to Goole, eight miles up, and for vessels of moderate size to York, a distance of 43 miles. The navigation is improved by an extensive weir and large lock at Naburn, a few miles above which the stream skirts the well-wooded grounds of Bishopthorpe, the official residence or palace of the Archbishops of York.

OUSELEY, Sir Frederick Arthur Gore, an English composer and musician; born in London, August 12, 1825. He was educated at Christ Church, Oxford, took the degree of doctor of music in 1854 and in the following year was appointed professor of music in his university. He then became incumbent of St. Michael's, Tenbury, and warden of St. Michael's College, an institution in which the teaching of choral singing is combined with a good classical education, and which owes its establishment chiefly to his efforts. In 1866 he was made a canon residentiary of Hereford Cathedral. His published compositions include two oratorios, *The Martyrdom of St. Polycarp* (1855) and *Hagar* (1873); a large number of anthems; many church services; numerous chants, hymn tunes and carols; a sacred cantata; besides overtures, glees, solos and quartettes. He also wrote *A Treatise on Harmony* (1868); *A Treatise on Counterpoint, Canon and Fugue* (1869), and *A Treatise on Musical Form and General Composition* (1875). He died in Oxford, England, April 6, 1889. W.M.C.

OVAMPOS, OVAMBO or OTJIHERERO, an industrious and peaceable Bantu people of the west coast of Africa, inhabiting Ovampoland, a country extending south of Cunene, in German West Africa, to Damaraland. Some fifty miles from the coast the country rises into a lofty tableland, which is moderately fertile, then declines to the south and east into the deserts of the Kalihari and the region of Lake Ngami. Indications of copper ore appear in various places. Ivory is still an article of trade. An attempt to establish a republic here in 1885, under the name of Appengtonia, failed. See also Africa, in these Supplements.

OVARIES, reproductive organs. See Reproduction, Vol. XX, pp. 420–421. For those in plants, see Botany, Vol. IV, p. 130.

OVEN-BIRD, a name given to South American birds of the genus *Furnarius*. These birds build hemispherical nests, which resemble an oven or beehive. The name is also sometimes applied to the North American golden-crowned thrush (*Sciurus aurocapillus*).

OVERBECK, Johannes A., a Belgian archæologist; born in Antwerp, March 27, 1826; a nephew of F. J. Overbeck (q.v., Vol. XVIII, p. 80); educated at Bonn; privatdocent (1850); professor of archæology at Leipsic (1853). His works include *Kunstarchäologische Vorlesungen* (1853); *Pompeji* (1855; 4th ed. 1884); *Geschichte der Griechischen Plastik* (1857; 4th ed. 1892); *Die Antiken Schriftquellen zur Geschichte der Bildenden Künste bei den Griechen* (1868); *Griechische Kunstmythologie* (1871–87).

OVERSTONE (Samuel Jones-Lloyd), Baron, an English economist and financier; born in London, Sept. 25, 1796; educated at Trinity College, Cambridge; entered his father's banking-house on leaving college; was elected to Parliament in 1819 for Hythe, and in 1850 was raised to the peerage as Baron Overstone and Fotheringhay. The first of Lord Overstone's famous tracts on the Bank of England and the state of the currency was published in 1837, and was followed by others between that period and 1857. The proposal for making a complete separation between the banking and issue departments of the Bank of England, introduced by Peel into the act of 1844, was first brought forward in these tracts. He died Nov. 17, 1883.

OVERSKOV, Thomas, dramatist; was born in Copenhagen, Denmark, on October 11, 1798. He wrote several highly successful dramas, the best known of them being *Ostergade og Vestergade* and *Capriciosa*, both of which retain their places in the theatrical repertory. He was also the author of an important *History of the Danish Theater*, which was published at Copenhagen in seven volumes in 1854–76, and did much for the promotion of dramatic act. He died at Copenhagen in 1873. W.F.J.

OVID, a village of Clinton County, central part of the southern peninsula of Michigan, on Maple River, 10 miles E. of St. John and 65 miles E. of Grand Rapids, and on the Detroit, Grand Haven and Milwaukee railroad. It contains several machine-shops and manufactures of flour, lumber and carriages, and is the center of a district producing wheat and wool. Population 1890, 1,423; 1900, 1,293.

OVID, a village and one of the capitals of Seneca County, southwestern New York, situated on a ridge between Seneca and Cayuga Lakes, about 25 miles S. of Waterloo, the other capital, and about 40 miles N. of Elmira. It is the center of a thriving local trade. About two miles from here, at the village of Willard, is the Willard Lunatic Asylum. Population 1900, 624.

OVUM. See Reproduction, Vol. XX, pp. 425–428; and Embryology, in these Supplements.

OWATONNA, a city and the capital of Steele County, southeastern Minnesota, on Straight River, and on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads, 15 miles S. of Faribault and 71 miles S. of St. Paul. It is the seat of the State School for Dependent Children, contains a valuable mineral spring, has manufactures of flour, carriages and agricultural implements, and a good shipping trade for a region producing immense quantities of wheat and raising live-stock. Population 1890, 3,849; 1900, 5,561.

OWEGO, a town of New York. Population 1900, 5,039. See Owego, Vol. XVIII, p. 88.

OWEN, David Dale, an American geologist, son of Robert Owen; born in New Lanark, Scotland, June 24, 1807. He accompanied his father to the United States in 1823, took a degree from the Ohio Medical College and for some years studied in Europe. In 1833 he was appointed state geologist of Indiana and under the direction of the legislature made a geographical survey of the state. In 1839 he was appointed by the United States government to make a survey of the mineral lands of Iowa. He then made a government geological survey of Wisconsin and Minnesota, and in 1852 was engaged in a geological survey of Kentucky. He became state geologist of Kansas in 1857. Among his publications are reports of his various surveys. He died in New Harmony, Ind., Nov. 13, 1860. W.M.C.

OWEN, Sir Philip Cunliffe, a British promoter of industrial art; born June 8, 1828; entered the navy in 1840, but retired on account of ill health; in 1854 became clerk, in 1860 assistant director, of the South Kensington Museum, and in 1873 succeeded Sir Henry Cole as director. In 1876 he was executive commissioner at the Centennial Exhibition at Philadelphia, and in 1878 he served as secretary of the royal commission for the Paris Exposition. He took an active part in the International Fisheries Exhibition at London in 1883, the health and education exhibitions in 1884, the Music Exhibition in 1885, and the Colonial and Indian Exhibition in 1887. In all these cases he displayed great executive ability, and promoted the objects of the industrial arts materially. In 1873 he was knighted. He retired in 1893, and died in Lowestoft, March 23, 1894.

OWEN, Sir Richard, an English anatomist and zoölogist; born in Lancaster, England, July 20, 1804. He became assistant curator of the Hunterian Museum; in 1834 he was appointed professor of comparative anatomy at Saint Bartholomew's Hospital; Hunterian professor on the same subject at the Royal College of Surgeons in 1836; superintendent of the natural history department in the British Museum in 1856. From a femur sent to him from New Zealand in 1839, he reconstructed the skeleton of the Diornis bird, and four years later, from fresh examples of subfossil bones, he distinguished five species of this genus. He was a master in the fields of animal fossils and of anatomy, a great collector and classifier of anatomical and palæontological remains, and profoundly versed in morphology. In these departments of science his name is linked with Cuvier, whom, in many respects, he resembled, both as to his anatomical insight and enthusiasm for palæontology. Toward the modern theories of the evolutionists Sir Ricard Owen maintained a conservative, though by no means hostile, attitude. Besides his numerous contributions to the *Transactions* of the Royal, Linnæan, Geological and Zoölogical societies, he published descriptive catalogues of the specimens of physiology and comparative anatomy in the museum of the Royal College of Surgeons, together with a catalogue of the natural history, the osteology and the fossil organic remains preserved in that institution. In 1879 he

SIR RICHARD OWEN.

was knighted. He received distinguished honors from foreign states, and was a member of all the principal scientific societies of Europe and America. Died in Richmond Park, Dec. 18, 1892.

OWEN, Robert Dale, publicist, son of Robert Owen, the founder of the "Chartist" movement in England, was born near Glasgow, Scotland, probably on November 6, 1801, though other dates are given, and was educated chiefly in Switzerland. He came to America with his father in 1823, and settled in Indiana. He was a representative in Congress from that state in 1843–47 and was chargé d'affaires at Naples in 1853–58. He was one of the organizers and one of the first regents of the Smithsonian Institution. During the Civil War he was an earnest advocate of the emancipation of the slaves, and a strong supporter of the national government. He also interested himself in other political and social questions, and had a memorable debate in print with Horace Greeley on the subject of divorce. Spiritualism commanded his earnest attention, and he was for years one of its foremost champions in America. He was the author of many books, the chief of them being *Education at New Lanark*, *Moral Physiology*, *Popular Tracts*, *Personality of God and Authority of the Bible*, *Pocahontas* (a drama), *Hints on Public Architecture*, *Footprints on the Boundary of Another World*, *Beyond the Breakers*, *The Debatable Land Between This World and the Next*, and *Threading My Way* (autobiography). He was also a prolific contributor to periodical literature. For many years he made his summer home at Lake George, N. Y., and he died there on June 17, 1877. W.F.J.

OWENS, John Edward, an American actor; born in Liverpool, England, May 4, 1824. He removed with his parents to the United States in 1828, and was educated in Philadelphia. He made his first appearance as an actor there in 1841. In 1849 he became manager of the Baltimore Museum and in 1852 opened Brougham's Lyceum in New York. After a tour of Europe, during which he played comedy rôles, he was manager of the Charles Street theater in Baltimore. He starred successfully for several seasons, playing in the leading cities of the United States and Canada. In 1864 he made a nine months' run at Wallack's theater, New York, in *Solon Shingle*, afterward playing the same part in London. After his return he starred in various stock companies. He died near Towson, Maryland, December 7, 1886. W.M.C.

OWENSBORO, a city and the capital of Daviess County, northwestern Kentucky, on the Ohio River, about 40 miles above Evansville, Indiana, and about 75 miles S.W. of Louisville, on the Louisville and Nashville, the Louisville, St. Louis and Texas and the Owensboro, Falls of Rough and Green River railroads. The city is the center of a region rich in agricultural and mineral products, and in timber. The leading industry is connected with the tobacco interests, the annual shipments reaching 18,000,000 pounds. There are numerous distilleries, lumber-mills, railroad machine-shops and manufactures of furniture. There are a number of fine public buildings, including the United States Government Building, the Woman's College and a large theater; public schools for both white and colored children; state savings and national banks, with a combined capital of $1,500,000; 18 churches of 7 denominations, and 2 daily and 4 weekly papers. The principal streets of the city are macadamized; there are gas and electric lights, and water is supplied by the Holly system. The population increased from 6,231 in 1880 to 9,837 in 1890, and to 13,189 in 1900.

OWENS COLLEGE. See Manchester, Vol. XV, p. 470.

OWEN SOUND, a town and port of entry and capital of Grey County, northwestern Ontario, at the outlet of Sydenham River, on Owen Sound, an arm of Georgian Bay, 130 miles N.W. of Toronto, and on the Canadian Pacific and the Grand Trunk railroads. It possesses a deep sheltered harbor, and has a large trade in lumber and grain, besides manufactories of furniture and woodenwares, machinery and woolen goods and ships. The Canadian Pacific steamers leave here for Port Arthur. Population 1891, 7,497; 1901, 8,776.

OWENS RIVER and LAKE. See California, Vol. IV, p. 618.

OWL–PARROT or GROUND–PARROT. See Kakapo, Vol. XIII, p. 834.

OWOSSO or OWASSO, a city of Shiawassee County, southeastern central southern peninsula of Michigan, on the Shiawassee River, and on the Ann Arbor, the Michigan Central and the Detroit and Grand Haven railroads, 78 miles N.W. of Detroit and 28 miles N.E. of Lansing. The river supplies abundant water-power, and the city has flour and planing mills, coffin, furniture and sash and blind factories, besides foundries and railway shops. Population 1890, 6,564; 1900, 8,696.

OX. See Cattle, Vol. V, p. 213.

OX–BIRD. See Sand-piper, Vol. XXI, p. 273.

OXENFORD, John, an English dramatist and critic; born in Camberwell in 1812; was called to the bar in 1833, but preferred a literary life; made himself familiar with French, German and Spanish literature, and became known by his admirable translations of such books as Goethe's *Dichtung und Wahrheit* and Eckermann's *Conversations with Goethe*. During the last thirty years of his life he was dramatic critic for the London *Times*, his criticisms being characteristic of the genial kindliness of his nature. His *Book of French Songs* showed as a translator a mastery of the lighter forms of verse. He wrote many plays; among them, the *Dance of Death;* the *Reigning Favorite;* the *Two Orphans;* as well as the libretto for *The Lily of Killarney*, and a farce, *Twice Killed*, that became widely popular. He died in London, Feb. 22, 1877.

OXENHAM, Henry Nutcombe, theologian; was born at Harrow, England, on November 15, 1829, and was educated at Harrow school and at Balliol College, Oxford. He was a minister of

the English Church until 1857, when he joined the Roman Catholic Church and became a professor at St. Edmund's College and master at the oratory school, Birmingham. He was a prolific writer, his works including poetry and prose, theology and fiction. Among his books were *The Sentence of Kaires and Other Poems* (1854); *Manual of Devotion for the Blessed Sacrament* (1854); *Church Parties* (1857); *Philip Paternoster* (1865); *The Catholic Doctrine of Atonement* (1865); *Dr. Pusey's Eirenicon Considered* (1866); *Recollections of Ober-Ammergau* (1871); *Catholic Eschatology and Universalism* (1876); *Short Studies in Ecclesiastical History and Biography* (1884); *Short Stories: Ethical and Religious* (1885); *Memoirs of Lieutenant Rudolph de Lisle, R.N.* (1886); *Thoughts for Holy Week* (1886), and a number of translations of the writings of Dr. Döllinger and others. He died in March, 1888. W.F.J.

OXFORD, a town of Calhoun County, northeastern Alabama, 20 miles N.E. of Talladega, on the Southern railroad. It is situated in a region whose staple product is cotton, and is an important shipping-point for that product. Population 1890, 1,473; 1900, 1,372.

OXFORD, a town of Newton County, north-central Georgia, about 38 miles E.S.E. of Atlanta, and 2 miles N. of Covington, the nearest railroad station, on the Georgia railroad. It contains the Palmer Institute, and is the seat of Emory College (Methodist Episcopal South), a co-educational institution established in 1837, having, in 1895, 14 instructors, 288 students and an equipment comprising 6 buildings and a library of 10,000 volumes. Population 1890, 791; 1900, 800.

OXFORD, a town of Talbot County, eastern Maryland, and a popular summer resort, situated on the eastern shore of Chesapeake Bay, on a navigable arm known as Three Haven or Tred Avon River, 10 miles S.W. of Easton, on the Philadelphia, Wilmington and Baltimore R. R. Pop. 1900, 1,243.

OXFORD, a township of Worcester County, central Massachusetts, on French River, 10 miles S. of Worcester and about 48 miles W.S.W. of Boston, and on the New England and the Boston and Albany railroads. It contains the villages of Texas, North Oxford, North Oxford Mills, West Oxford and Oxford, of which the last named is the largest and most important, having several churches, a public library, large boot and shoe factories, and cotton and woolen mills. The other villages are devoted to manufacturing. Population of the town in 1890, 2,616; 1900, 2,677.

OXFORD, Mississippi, is a city and the county seat of Lafayette County, in the central-northern part of the state. It is a center of the cotton-growing and manufacturing industry, and has also some trade in lumber, canned fruits and vegetables, etc. It is the seat of the University of Mississippi (q. v.), and of several other educational institutions, and is a favorite place of residence. It is reached by the Illinois Central railroad, and had in 1900 a population of 1,825. W.F.J.

OXFORD, a village of Chenango County, southern central New York, beautifully situated in the fertile valley of the Chenango River, eight miles S.S.W. of Norwich, on the Delaware, Lackawanna and Western and the New York, Ontario and Western railroads. The surrounding country is rich in dairy products, and has quarries of bluestone. The village contains Oxford Academy, and has manufactures of flour, sleds and baskets. Population 1890, 1,477; 1900, 1,931.

OXFORD, a town and the capital of Granville County, northern North Carolina, 42 miles N. of Raleigh, on a northern affluent of the Tar River, and on the Southern railroad. It contains an orphan asylum, and is extensively engaged in the tobacco trade, having several manufactories and large warehouses. Tobacco is the staple product of the surrounding country. Population 1890, 2,907; 1900, 2,059.

OXFORD, a village of Butler County, southwestern Ohio, 39 miles N.W. of Cincinnati, on the Cincinnati, Hamilton and Dayton railroad. It contains important manufactories of agricultural implements. It is the seat of Oxford College (Non-Sect.), an institution established in 1849 for the education of women, which had, in 1901, 19 instructors, 150 students, and a library of 3,000 volumes. Western Female Seminary, a non-sectarian institution of learning, and Miami University (q.v., in these Supplements) are also located here. Population 1890, 1,922; 1900, 2,009.

OXFORD, Pennsylvania, is an important borough of Chester County, in the southeastern part of the state, forty-five miles southwest of Philadelphia. It contains flour mills, factories of vehicles, and other industries, and is the seat of several institutions of higher learning. One of the latter, Oxford Academy, is a large secondary school founded by the Presbyterian Church. Lincoln University was also founded by Presbyterians, near Oxford, for the education of negroes, and has been a successful and valuable institution. Oxford is in a rich agricultural and fruit-growing region, is reached by the Philadelphia, Wilmington and Baltimore and Lancaster, Oxford and Southern railroads, and had in 1900 a population of 2,032. W.F.J.

OXFORD FURNACE OR OXFORD, a town of Warren County, northwestern New Jersey, 15 miles N.E. of Phillipsburg and 30 miles W. of Morristown, on the Delaware, Lackawanna and Western railroad. It contains many extensive foundries, furnaces, factories, machine-shops and mills. Population of township (1900), 3,095.

OXFORD MOVEMENT, OR TRACTARIAN MOVEMENT, originated during the second quarter of the nineteenth century, and was a High Church reaction toward mediæval Roman Catholicism, as well as against rationalism and formalism. The first sign of the movement may be traced to the publication, in 1827, of John Keble's *Christian Year*. John Henry Newman was brought under the influence of this brilliant scholar, who preached a sermon, July 14, 1833, on *National Apostasy*, regarded by Newman as the real starting-point of the agita

tion. The famous *Tracts for the Times* began to appear September 9th, the authors including such writers as Hugh James Rose, John Keble, John Henry (afterward Cardinal) Newman, Edward Bouverie Pusey, and other divines. These tracts extend to a series of ninety, and advocated apostolic succession, baptismal regeneration, confession, the real presence and the authority of the church and of tradition. The movement culminated in the neo-Catholic schism headed by Newman. See PUSEY, Vol. XX, p. 122.

OX-GALL, the bile of the ox as found in the gall-bladder. In composition it contains, in 100 parts, water, 90.44; biliary and fatty bodies, including resinoid acids, 8; mucus, .30; watery extract, chlorides, phosphates and lactates, .85; soda, .41 The union of the resinoid acids and the soda results in the soapy constitution of the bile. In medical practice it was formerly common to administer it to patients deficient in bile, to aid in the digestion of fats; in clysters, for the purpose of dissolving hardened masses of feces; and as a liniment, its properties being considered to be discutient. Artists use gall, refined from its coloring and coagulable matter, in mixing colors, improving their tint while also fixing them and making them flow easier. It is a constituent of some varnishes, and is used in cleaning ivory tablets for artists' use. See ABATTOIRS, in these Supplements.

OXLEY, JAMES MACDONALD, a Canadian author and lawyer; born in Halifax, Nova Scotia, October, 22, 1855. He was graduated from Dalhousie University, Halifax, in 1874, and studied at Harvard in 1876. He was admitted to the bar in 1878 and practiced law in Halifax. In 1883 he was appointed legal adviser in the Dominion department of marine and fisheries. He resigned from office in 1891 and engaged in the life insurance business in Ottawa and Montreal. He has written a large number of books for boys, including *Donald Grant's Development* (1892); *Archie of Athabaska* (1893); *In the Swing of the Sea* (1897); *Fife and Drum at Louisbury* (1899), and *Lhasa at Last*, a journey to the Forbidden City of Tibet (1900). He has also written two legal works, *Nova Scotia Decisions* (1880), and *Admiralty Decisions* (1882). W.M.C.

OXYCALCIUM LIGHT OR LIME-LIGHT. See MAGIC LANTERN, Vol. XV, p. 213.

OXYGEN AND OXIDES. See CHEMISTRY, Vol. V, pp. 413–417; and in these Supplements.

OXYHÆMOGLOBIN. See RESPIRATION, Vol. XX, p. 497.

OXYHYDROGEN BLOWPIPE. See OXYHYDROGEN FLAME, Vol. XVIII, pp. 108, 109; and BLOWPIPE, Vol. III, p. 730.

OYAMA, MARQUIS, a Japanese general and statesman; born 1842, famous for his military skill and valor. He won distinction in the civil war in southern Japan, and at the outbreak of the Russo-Japanese War was placed in command of an army mobilized at Hiroshima, Sept. 26, 1894, and in January, 1895, was given command of the third Japanese army. Field-Marshal Oyama was wisely made commander-in-chief of the Japanese land forces in the Russo-Japanese War of 1904–05, as his brilliant success in the field proved. A.R.R.

OYSTER. The oyster-fishery is by far the most important of the fishing industries of the United States. The American oyster (*Ostrea virginiana*) is found along the Atlantic coast from Florida to the Gulf of St. Lawrence. In some portions of this range it occurs in natural beds of large extent, that of Long Island Sound being 115 miles in length. Chesapeake Bay, with its many inlets and river mouths, is the best-adapted home for the American oyster. It attains here its highest excellence. The bottom of this bay is almost covered with beds of the finest oysters in the world. Baltimore is the most important mart in the oyster trade. It cans and pickles vast quantities of oysters for shipment to the West and to foreign countries. Farther south the coast oysters occur plentifully, but are only gathered for local use. On the coast of Georgia they occur, in some places, in such abundance as to form natural breakwaters firm enough to resist the billows of the ocean. The coast region here is made up of salt marshes from 12 to 18 miles wide, through which slow-flowing rivers make their way to the sea. These rivers flow between banks of living oysters so closely compacted that a vessel might, in some places, obtain a cargo in a space only three or four times its own length. Oysters abound, also, in the inlets and small bays of the Gulf of Mexico. In the Bay of Mobile they are plentiful and of excellent quality, and are cultivated on a large scale. In Louisiana are beds of oysters unsurpassed in size and flavor. On the Pacific coast, oysters exist abundantly, in the Strait of Fuca and in Puget Sound. These oysters are, however, quite small, but of fine flavor. The Eastern oyster has lately been introduced on the Pacific coast, and seems to be susceptible of easy cultivation there. In like manner oysters of the Chesapeake are brought to Long Island and planted there to supply the beds that have become exhausted by over-dredging.

Oysters are said to be fatter in winter than in summer. What is called "fat" in the oyster is, however, no fat at all, but a deposit of protoplasm, which forms a very digestible and highly nutritious food for man. It is laid down in the mantle or fleshy portion of the animal during the winter season, and again exhausted during the reproductive period in summer, when the oyster becomes poor and non-nutritious. The so-called "fattening," by removing the oysters for a few days to water fresher than that in which they grew, is a dealer's trick. The oyster absorbs more fresh water than sea-water. By this means it becomes plumper, and at the same time loses part of its saltness. Some dealers even warm the water by means of steam, in order to induce the oyster to take in more water, and thereby become plumper.

The principal food of the oyster consists of microscopic beings and fragments of organic matter, which are carried by the currents of water to the mouth of the animal at the hinge end of the shell. When this material is examined through the microscope, it is seen that the animal subsists largely upon what scientists call "diatoms"—one of the lowest

types of moving plants which swim in the water, encased in minute sandstone cases or boxes of delicate workmanship. When these have been found in the intestines of the oyster, they have usually had their living contents already dissolved out by the action of the gastric juice.

Some American oyster-lovers reject green oysters, under the impression that they are poisonous, or at least unhealthy. In France and England green oysters are looked upon as a special delicacy. They bring higher prices than the ordinary varieties. Investigation has demonstrated that their green color is due to the eating of green vegetable food, as the young grass growing on the bottom of shallow oyster-beds. The chlorophyll of the green food is absorbed in such quantities as to tint the blood-cells of the animals greenish. Green oysters are, in reality, more palatable and nutritious than white ones.

As to the statistics of the oyster-fishery in the United States we take from the census report of 1890 the following data, giving the value produced by molluscan fishery (oysters, clams and scallops), in the maritime states during that year: Alabama, $107,812; California, $782,627; Connecticut, $1,476,435; Delaware, $75,910; Florida, $109,649; Georgia, $40,820; Louisiana, $299,896; Maine, $165,478; Maryland, $5,304,092; Massachusetts, $343,171; Mississippi, $166,672; New Hampshire, $975; New Jersey, $2,142,444; New York, $3,570,211; North Carolina, $188,457; Oregon, $3,887; Pennsylvania, $101,850; Rhode Island, $359,216; South Carolina, $23,204; Texas, $127,990; Virginia, $2,556,098; Washington, $153,695. The total value of the product of the United States molluscan fisheries, as sold for the year preceding the census enumeration of 1890, was $18,100,598. In 1900, the value of canned oyster products was $1,535,693.

Baltimore packs 7,000,000 bushels per annum. The industry in Maryland is now protected by legislation, and directed by a state commission. An oyster three months old is the size of a quarter-dollar, six months old, a half-dollar, but is not fit to eat before four years old. The oyster-beds established by advice of Abbé Bonnetard in France produced 97,000,000 oysters in 1831. (See Vol. XVIII, pp. 110–114.)

Country.	Bushels.	Value.
United States	29,796,387	$16,638,805
Great Britain	2,760,000	6,200,000
France	2,000,000	5,000,000
Holland	70,000	444,000
Italy	65,000	200,000
Canada	152,580	183,846
Germany	13,000	75,000
Miscellaneous	400,000	600,000
Totals	35,256,967	$29,341,651

A comparison of the oyster-product of the world is shown in the preceding table, given in *The Oyster Industry of Maryland* (1894):

The comparative consumption of the bivalve in three of the principal cities is seen by the following figures (*Mulhall's Statistics*):

	Consumption. Millions.	Per Inhabitant.
London	220	60
Paris	57	26
New York	810	660

OYSTER–DRILL, a name which the oyster-fishermen apply to a small gasteropod mollusk (*Vrozalpinx cinerea*) of the family *Muricidæ*. It is said to drill holes in the shell of the oyster with its lingual ribbon, in order to reach the soft parts.

OYSTER–PLANT. See *Salsify*, under Horticulture, Vol. XII, p. 300.

OZARK, a village and the capital of Dale County, southeastern Alabama, about 45 miles S.W. of Eufaula and about 75 miles S.S.E. of Montgomery, on the Alabama Midland railroad and the Central Railroad of Georgia. It is in an agricultural and pine forest region, and has a tannery, a cotton-gin factory, and flour, cotton, saw and grist mills. Population 1890, 1,195; 1900, 1,570.

OZARK, a town and the capital of Franklin County, northwestern Arkansas, on the Arkansas River, 43 miles below Fort Smith, and on the St. Louis, Iron Mountain and Southern railroad. The surrounding country is hilly, coal is found, and cotton, corn, sweet and white potatoes, hogs and live-stock are produced. The town has a cotton-gin. Population 1890, 862; 1900, 848.

OZARK MOUNTAINS, a series of mountains, or more properly hills or ridges, as they nowhere exceed two thousand feet in elevation, steep and heavily timbered, extending from southeastern Missouri throughout eastern Arkansas into Indian Territory. In their mineral structure these mountains resemble the Alleghanies. Coal, iron and lead have been found in them, and deposits of the precious metals are believed to exist. The Ozark region of Missouri was for many years noted for the deeds of lawlessness which were committed there.

OZONE. See Chemistry, Vol. V, pp. 417, 418; and in these Supplements.

P

PABNA—PACIFIC RAILWAYS

PABNA, a town of Bengal, India, and capital of the district of Pabna, on an arm of the Ganges, 115 miles N. of Calcutta. It has government buildings, a hospital and indigo-works. Population, 16,500, composed of Hindus and Mohammedans. The district has an area of 1,847 square miles and a population of 1,311,728. It is a fertile plain, traversed by numerous watercourses. Pop. of city, 16,500.

PACA OR CÆLOGENYS PACA. See *Dasyproctidæ*, under MAMMALIA, Vol. XV, p. 426.

PACA, WILLIAM, an American statesman; born in Harford County, Md., Oct. 31, 1740. He graduated at Philadelphia College in 1759; studied law, and began practice in Annapolis, Md. He was a member of the Provincial House of Representatives, 1771–74; delegate to the Continental Congress, 1774–79; state senator, 1777–79; chief justice of the supreme court of Maryland, 1778–80, and of the court of appeals, 1780–82; governor of Maryland, 1782–86; United States district judge from 1789 till his death, which occurred at Wye Hall, Md., in 1799. E.E.T.

PACCHIONIAN BODIES. See ANATOMY, Vol. I, pp. 759–760.

PACHUCA, a mining town and the capital of the state of Hidalgo, southeastern central Mexico, 56 miles N.N.E. of Mexico, on the Hidalgo and North-Eastern, Mexican, and Mexican Central railroads. It is situated in a valley surrounded by lofty mountains, and is celebrated for its silver-mines, which were worked before the Spanish conquest, and, with the neighboring mines of Real del Monte, produce one sixth of all the silver mined annually in Mexico, the yearly reduction of ore being from 70,000 to 90,000 tons. Here, in 1557, Bartolomeo Medina discovered and first used the *patio* process for extracting ore by the help of sulphide of copper, salt and mercury. Population 1895, 40,487.

PACIFIC, a town of Franklin County, eastern Missouri, on the Maromee River, and on the Missouri Pacific and the St. Louis and San Francisco railroads, 37 miles W.S.W. of St. Louis. It has rich beds of white-glass sand and fire-clay, deposits of iron, copper and lead, and a flour-mill, sand-crusher and tripoli factory. Population 1890, 1,184; 1900, 1,213.

PACIFIC RAILWAYS. In 1856 both the Democratic and Republican national conventions adopted resolutions in favor of granting government aid to the construction of a railroad to the Pacific Coast. Similar resolutions were adopted at the conventions of 1860, and the breaking out of the Civil War, with the unfriendly attitude of Great Britain and France toward the Federal government, established the need of such a road as a war measure, if for no other purpose. Accordingly, a bill, providing for the construction of a railroad connecting the eastern system with the one which had begun to come into existence on the Pacific Coast, passed the Congress June 24, 1862, and was approved July 1, 1862, by President Lincoln.

By this act the Union Pacific Railroad Company was chartered to construct a railroad and telegraph line from the Missouri River, at Omaha, Nebraska, to the western boundary of Nevada, in the general direction of San Francisco. The Central Pacific Railroad Company, a corporation organized under the laws of the state of California, was recognized by this act, and authorized to extend its line to the eastern boundary of California, and, if necessary, to continue the construction beyond that point to a connection with the Union Pacific. The Leavenworth, Pawnee and Western Railroad Company, a Kansas corporation, chartered to build a railroad from Leavenworth to Lawrence, was authorized to construct a line from Kansas City, along the valley of the Republican River, and to a junction with the Union Pacific at the 100th meridian, and to receive the regular subsidy in bonds and land for this mileage. The name of the company was thereupon changed to the Union Pacific Railway Company, Eastern Division. Another branch line was authorized to extend due west from Atchison, Kansas, to connect with the line from Kansas City, an estimated length of one hundred miles, and the Atchison and Pike's Peak Railroad Company proposed and was authorized to build that road; whereupon the name of that company was changed to the Central Branch Union Pacific Railroad Company. It was further provided that upon the completion of a railroad from Chicago or St. Paul to Sioux City, a line might be constructed from Sioux City to a connection with the Union Pacific or its Sioux City extension, and authority to construct such a road was granted to the Sioux City and Pacific Railroad Company, organized for that purpose on Aug. 1, 1864.

Government aid was granted for the construction of these lines, in the shape of a land grant of 6,400 acres per mile, together with United States subsidy six-per-cent thirty-year bonds of $16,000 per mile for the branch lines and the portion of the main line from Omaha to the base of the Rocky Mountains, and from San Francisco to the base of the Sierra Nevadas—that is to say, for the level and easily constructed mileage; for the sections where the road climbed the two mountain ranges, the subsidy was increased to $48,000 per mile; and for the plateau region between the Rocky Mountains and the Sierra Nevadas, the subsidy was to be $32,000 per mile.

In consideration of these grants, the companies

were to complete their roads by July 1, 1876; to transport troops, munitions of war, postal matter, etc., for the United States at rates as favorable as those charged to private parties; to allow the use of their telegraph on similar terms; to pay into the Treasury of the United States five per cent of the net earnings of their respective roads, and allow the government to retain the whole of the charges for transportation on its account—the two sums so provided to be applied to the payment of interest on the government bonds as it matured, the companies also being required to pay the principal of the bonds at their maturity, together with any balance of interest that might then be due.

The act incorporating the Union Pacific authorized an issue of stock to the amount of $100,000,000, the total issue, however, being limited in amount to the total cost of the road, and it was provided that, as conditions precedent to a permanent organization and the election of a board of directors, at least $2,000,000 stock should be subscribed and ten per cent paid in thereon.

The Central Pacific Company formally accepted the terms offered by Congress on Oct. 7, 1862, and the work of construction was begun at Sacramento on Jan. 8, 1863.

The Union Pacific effected a temporary organization, and subscription-books were opened in the leading cities of the country. On Oct. 29, 1863, $2,177,000 of the stock had been subscribed and $217,700 (ten per cent) paid in thereon, and accordingly the company was permanently organized. The amount of paid-up stock subscriptions was soon used up, and as no further subscriptions could be secured, the company became pecuniarily embarrassed. The capitalists of the country did not consider the Union Pacific a promising investment as matters stood, the prices of both labor and materials being abnormally high at the time, and for these and similar reasons they held aloof from the enterprise. At the request of the Union Pacific, therefore, Congress, in 1864, amended the former act by making terms more favorable to the companies, the chief of these being preference to an amount of bonds to be issued by the companies equal to the subsidy bonds of the government, and a provision that the government should pay over to them one half of the charges for services on its account. Also, the land grant was increased to 12,800 acres per mile, making the total grant to all the companies about 39,000,000 acres. The transcontinental line was completed May 10, 1869, the Union Pacific having constructed 1,034 miles from Omaha, Nebraska, to Ogden, Utah, and the Central Pacific, beginning at Sacramento, 743 miles. Meanwhile, the Central Pacific Company had assigned to the Western Pacific Railroad Company the right to construct the road from Sacramento to San José, together with the benefits and responsibilities attaching to the work, and on Sept. 1, 1869, the road was completed and put in operation.

In 1869 the Sioux City and Pacific railroad was completed from Sioux City to Fremont, Nebraska, 102 miles, and in 1870 the Union Pacific Railroad Company, Eastern Division, completed its line from Kansas City to Denver, 638 miles.

By the act of 1862 the line from Sioux City was intended to run to the 100th meridian, but the amendment of 1864 allowed a junction either with the Union Pacific's Sioux City branch (proposed) or with the main line of that road. To cross the Missouri River immediately at Sioux City and proceed in a southwesterly direction, according to the intention of the act, would have placed the whole land grant in Nebraska. There were more valuable lands in western Iowa, so the projectors chose a course slightly east of south from Sioux City, and crossed the river at a point only a little way above Omaha. The junction with the Union Pacific was at Fremont, a short distance west of Omaha.

The projectors of the Union Pacific, Eastern Division, doubting that the Union Pacific would ever build its road as originally planned, procured the insertion into the act of July 2, 1864, of a section providing that if the line from Omaha had not been constructed when the Eastern Division reached the 100th meridian, the latter might proceed to build westward on the proposed route of the Union Pacific, and receive the subsidy, for such work. In 1866, however, the Eastern Division was released from the necessity of joining the Union Pacific at the 100th meridian. Under the authority granted by this act, the old route by way of the Republican fork of the Kaw River was abandoned, and a new one, following the Smoky Hill branch of that stream, was adopted, the point of divergence from the original route being Fort Riley. It was the intention of the company to build its road southwest from Denver through New Mexico and Arizona, and on to the southern part of California; but this plan was frustrated by the act of 1866, which required the Eastern Division to join the Union Pacific at a point not more than fifty miles west of Denver. The act extended the company's land grant to cover the additional mileage to its junction with the Union Pacific, but the issue of subsidy bonds was confined to the length of line (394 miles) originally provided for. In March 1869, authority was obtained from Congress to transfer to the Denver Pacific Railway and Telegraph Company, a Colorado corporation, all the rights and privileges to which the company was entitled for the construction of a railroad between Denver and the junction with the Union Pacific at Cheyenne; and in the same month, by special act of Congress, the company was authorized to assume the title of Kansas Pacific Railway Company. The Denver Pacific line was opened June 23, 1870.

The Central Branch Union Pacific, the last of the branch lines provided for, was completed from Atchison to Waterville, Kansas, one hundred miles, and opened Jan. 20, 1868. Subsidy bonds for the first completed section of twenty miles

were issued Aug. 2, 1866, those for the fifth and last section Jan. 24, 1868.

Meanwhile, rumors had begun to be circulated impugning the reports of the commissioners who had accepted the several sections of the Pacific railroads, and hinting at unlawful means employed by the companies to secure these reports. In consequence, Congress, in April, 1869, appointed a committee to investigate the affairs of the Union Pacific Company, and inquire whether its charter had not been forfeited. At the same time provision was made for the appointment of a commission to examine the roads and ascertain whether they fulfilled the requirements of law, and also what further expenditures were needed to make them first-class roads. Its report was handed in Oct. 30, 1869, and it specified the improvements needed.

When the matter came up in Congress in 1876, the Judiciary Committee of the House reported that "the railroad companies concede that one half of the compensation for services, and perhaps five per cent of the net earnings, of the roads should be applied, so far as they will go, in reducing the interest account, but they claim that they are not required in any other manner to pay any of the interest until the maturity of the subsidy bonds, *and not even then.*

"The following table shows the principal of the subsidy bonds issued to each company, the amount which each company would owe the government at the maturity of the subsidy bonds for interest paid by the government, with interest compounded thereon, and the amount of interest paid to maturity of subsidy bonds without any interest computed thereon."

Name of Companies.	Date of Maturity of Subsidy Bonds.	Principal of Subsidy Bonds.	Compound Interest to Maturity.	Simple Interest to Maturity.
Central Pacific	Nov. 18, 1897	$25,885,120	$126,619,733 30	$46,593,216 00
Kansas Pacific	Nov. 17, 1896	6,303,000	30,831,774 36	11,345,400 00
Union Pacific	Sept. 3, 1897	27,236,512	133,230,206 60	49,025,721 60
Central Branch Union Pacific	Oct. 20, 1896	1,600,000	7,826,564 96	2,880,000 00
Western Pacific	Sept. 5, 1898	1,970,560	9,639,197 41	3,547,008 00
Sioux City and Pacific	Jan. 1, 1898	1,628,320	7,965,095 16	2,930,976 00
Totals		$64,623,512	$316,112,571 79	$116,322,321 60

In January, 1872, another Congressional committee was appointed "to make inquiries in relation to the affairs of the Union Pacific Railroad Company and the Crédit Mobilier of America." The outcome of this investigation was the law of March 3, 1873, which, among other things, repealed the requirement that the government should pay over to subsidized railroad companies one half of the charges for transportation on government account, thus restoring the text of the act of 1862. The Union Pacific tested the right of the government to retain full transportation charges in the courts, which decided that the government could only retain one half of the charges on its account, and that no interest on the subsidy bonds was payable until their maturity, except the five per cent of net earnings and one half of charges on government transportation. The supreme court decision to this effect was handed down some time in 1876.

A proposition was now made to the government that the company should pay into the United States Treasury $500,000 per annum for ten years commencing July 1, 1875, $750,000 per annum for ten years commencing July 1, 1885, and $1,000,000 annually thereafter until the maturity of the bonds; the money so paid in, together with the sum of $800,000 claimed by the company as due it for government transportation at the time of making the proposition (February, 1875), to be held by the Secretary of the Treasury as a sinking-fund, devoted to the extinction of the government mortgage, compound interest to be allowed on the money so held at the rate of 6 per cent per annum.

Notwithstanding this enormous equitable obligation, the railroad companies were able to defeat all measures to bring them to terms. They were content with the position in which the courts had placed them.

Alarmed at the rapid rate with which the balances against the companies on account of interest was increasing, Congress passed, in 1878, what is known as the Thurman Bill for the establishment of a sinking-fund for both Union Pacific and Central Pacific. This act provided that there should be carried to the credit of the sinking-fund, on the 1st of February in each year, the one half of the compensation for government service, and also the sum of $850,000, or so much thereof as would be necessary to make the five per cent of the net earnings of the road payable to the United States under the law of 1862, and the whole sum earned as compensation for government service; also, a sum amounting to 25 per cent of the whole net earnings of the road, the net earnings to be ascertained by deducting from the gross earnings the expenses of operation, together with interest on first-mortgage bonds.

This measure materially increased the yearly amounts to be paid to the government, but even then they were not sufficient to pay the interest and meet the requirements of the sinking-fund. Consequently, the debt due to the government increased steadily, and, as the dates of maturity of the several issues of bonds drew nigh, alarm began to be felt for the security of the government's claim. Measures looking to the settlement of the vexed question were introduced in Congress, but were passed on from session to session with-

out any satisfactory solution of the problem being reached. Meanwhile, the Union Pacific had become financially embarrassed and its property placed in the hands of receivers. To sell the property under foreclosure of its first mortgage the government recognized would put its claim in imminent jeopardy, and therefore renewed efforts were made to bring about a settlement. Several projects were urged, agreeing, however, in principle. They proposed funding the government claim in very long-time bonds, even to eighty years, at low rates of interest, and making these obligations a first lien on all the property of the defaulted companies. But at the close of 1896 the hard problem had not been solved and no settlement had been reached.

The debt matures rapidly; indeed, several blocks of it, running into the millions, have already been paid by the government and larger amounts will shortly fall due. The plan of the Reorganization Committee of the Union Pacific proposes to set aside $35,755,280 in new four per cent bonds to pay the debt of the United States, or meet other "extraordinary requirements," and $20,864,400 of the new preferred stock for the same purposes. See also RAILROADS, in these Supplements.

JOHN P. MEANY.

PACINIAN CORPUSCLES. See ANATOMY, Vol. I, p. 757; and TOUCH, Vol. XXIII, pp. 508–510.

PACING. See TROTTING AND PACING, in these Supplements.

PACKARD, ALPHEUS SPRING, scientist and educator, was born at Brunswick, Maine, on February 19, 1839, and was graduated from Bowdoin College in 1861, and from the Maine Medical School in 1864. He also studied under Louis Agassiz at the Lawrence Scientific School of Harvard University for three years. He was an assistant surgeon in the army in 1864–65, librarian and custodian of the Boston Society of Natural History in 1865–66, curator of the Essex Institute in 1866, curator and director of the Peabody Academy of Science in 1867–78, State entomologist of Massachusetts in 1871–73, and a member of the U. S. Entomological Commission in 1877–82. He was the founder and for twenty years the editor of *The American Naturalist.* Since 1872 he was a member of the National Academy of Sciences, and a member of a dozen or more learned societies in Europe. He became professor of zoölogy and geology in Brown University in 1878, and held that place until his death. He wrote many books, including *Guide to the Study of Insects; The Mammoth Cave and Its Inhabitants; Our Common Insects; Life History of Animals; Zoölogy for High Schools and Colleges; First Lessons in Geology; First Lessons in Zoölogy; A Text-Book of Entomology; Observations on the Glacial Phenomena of Labrador and Maine,* and *A Naturalist on the Labrador Coast.* He also wrote hundreds of papers, addresses, etc. Died Feb. 14, 1905. W.F.J.

PACKER, ASA, an American public man and philanthropist; born in Groton, Conn., Dec. 29, 1806. He received a public-school education and removed to Springfield, Pa., in 1820, where he became a carpenter. He settled in Mauch Chunk in 1832, and became largely interested in the production of coal and the construction of railroads. He served in the Pennsylvania House of Representatives, and sat as a Democrat in the national House of Representatives from Dec. 5, 1853, to March 3, 1857. In 1865 he founded Lehigh University at South Bethlehem, Pa., and liberally endowed it. He was a delegate to the National Democratic Convention in 1868, and died in Philadelphia, Pa., May 17, 1879.

E.E.T.

PACKING now includes the whole processes connected with the "manufacture" of the products from cattle, sheep and hogs for the various demands of the market. The term was formerly applied solely to the curing and packing of hog-products, but around this industry arose the no less profitable and indispensable ones for preparing the products of cattle and sheep. Associated, also, with these, many new industries sprang up as a result of scientific methods of utilizing the waste products, which secured in themselves a handsome profit.

The origin of packing is obscure. It has been stated, though the authority is doubtful, that pork was cured and packed in barrels in Salem, Massachusetts, as far back as 1640. In 1690 Boston had a large trade in packing. In 1818 Elisha Mills established a packing-house at Cincinnati. In 1832 Cincinnati slaughtered 85,000 hogs. No attempt at packing in Chicago seems to have been made until about 1832. It has been claimed that 9,600 hogs were packed in Chicago in 1834; but it was not until 1850 that the city figured in the statistics. In 1845 Cincinnati boasted of the title of Porkopolis, when its business even exceeded that of Cork or Belfast, Ireland. About that time the number of regular packing-houses in that city were 26, ten years later the number was 41, after which time the number remained about stationary. In 1843–44 the total number of hogs packed in the West reached a total of over 1,000,000. Cincinnati held her own until 1861–62; then Chicago passed her and has since maintained the lead, this center handling about 35 per cent of the total number of hogs marketed in the West. Writing in 1895 on the packing industry in *One Hundred Years of American Commerce,* Philip D. Armour said: "During the past ten years Western packers have paid out $1,429,000,000 for hogs, or an annual average of about $143,000,000, reaching $172,679,000 for the year ending March 1, 1895." The aggregate value, in 1844, of 623,000 animals (cattle, sheep and hogs) marketed in Boston, New York, Philadelphia and Baltimore was $7,500,000. In 1894 the value of the 9,445,782 animals marketed in the same cities was, approximately, $140,000,000.

Of the total number of 21,619,645 hogs packed and marketed in the United States for the year

ending March 1, 1895, the largest numbers were credited to the following cities: Chicago, 5,293,202; Kansas City, 2,105,333; Omaha, 1,550,821; Boston, 1,748,000. The number of cattle killed in the four Western cities (Chicago, St. Louis, Kansas City and Omaha) was, in 1894, 3,958,000; and on the seaboard, 1,079,000. The number of sheep killed in the West for the same year was 3,564,000; and for the East, 4,079,000.

The capital invested in the United States in the packing industry, as estimated for the year 1890, was $116,887,504.

The following figures represent the total amounts exported, and the values thereof, of beef and pork products and mutton, for the year ending June 30, 1895:

	Pounds.	Value.
BEEF-PRODUCTS.		
Beef, canned	64,102,263	$5,720,933
Beef, fresh	191,338,487	16,832,860
Beef, salted	62,473,325	3,558,230
Beef, other cured	821,673	73,569
PORK-PRODUCTS.		
Bacon	452,549,976	$37,776,293
Hams	105,494,123	10,960,567
Pork, fresh	818,581	60,660
Pork, pickled	58,266,893	4,138,400
Mutton	591,449	$47,832.

For utilization of products and methods of killing and dressing, see ABATTOIRS, in these Supplements.

PACTOLUS, Turkey in Asia, the ancient name of the Sarabat or Gediz-Cha, a river flowing into the Gulf of Smyrna. Its golden sands are said to have enriched Crœsus. C.L.S.

PADANG. See SUMATRA, Vol. XXII, pp. 672–674.

PADDLE-FISH (*Polyodon spatula*), a ganoid fish in which the nose is greatly prolonged into a paddle-like structure, which is sometimes one fourth the length of the fish itself. This paddle is used for stirring the mud of the bottom when the fish is in search of food. The fish may reach a length of six feet. It is common in rivers of the Mississippi system. The names *spoonbill* and *duckbill-sturgeon* are often applied to this fish.

PADEREWSKI, IGNACE JAN, a Polish pianist; born in Podolia, a province of Russian Poland, Nov. 6, 1860. He began to play on the piano at the age of three years. At the age of seven he was placed under the instruction of Pierre Sovinski, a local master. In 1872 he went to Warsaw, where the foundation of his knowledge of harmony and counterpoint was laid by Roguski. Later he pursued his musical studies under Frederick Kiel, in Berlin. His first musical tour was made through Russia, Siberia and Roumania, during which he played his own compositions. At eighteen years of age he became professor of music in the Conservatory of Warsaw. In 1884 he was promoted to a professorship in the Conservatory of Strasburg; but in less than a year he determined to abandon teaching and enter upon the career of a piano virtuoso. After three additional years' study with Teschitzki, in Vienna, he began his professional tours, appearing in Germany; in 1889 at Paris, and in 1890 at London. He married at the age of nineteen. Later, his wife died, but a son survived her. In the autumn of 1891 he visited New York and began a tour of extraordinary success in the chief American cities. His American tour in 1893, when he visited the World's Fair at Chicago, brought him $150,000. He repeated the visit in 1896, realizing $187,000. He donated the sum of $10,000, the interest to be devoted to the encouragement of American composers by the award of three triennial prizes. He also dedicated to his American admirers a *Menuet Moderne*, in contradistinction to his *Menuet à l'Antique* (1883). He has also composed about 80 vocal works; a *Polish Phantasie*, produced at the Norwich festival in 1893; and an opera, *Stanislaus* (1898).

I. J. PADEREWSKI.

PADUCAH, a city of Kentucky. Paducah in 1890 was a center for three railroads, the Chesapeake and Ohio Southwestern, the Paducah, Tennessee and Alabama and the St. Louis, Alton and Terre Haute. Its tobacco trade has reached large proportions, there being numerous factories and warehouses, making this city one of the most important tobacco-markets in the United States. Other industries include saw and flour mills, foundries and machine-shops, carriage factories and ship-yards. Paducah makes extensive shipments of corn, pork and iron. The city has parks, gas and electric lights, electric street-railways, water-works and fire department, good public schools, a young ladies' seminary, 19 churches, two daily and four weekly newspapers. Population 1890, 12,797; 1900, 19,446. See also PADUCAH, Vol. XVIII, p. 136.

PAGANISM. See CHRISTIANITY, Vol. V, p. 605.

PAGE, THOMAS NELSON, an American author; born on Oakland Plantation, Hanover County, Va., April 23, 1853. He was educated at Washington and Lee University, Va., and graduated from the Law Department of the University of Virginia. He practised law in Richmond from 1875 to 1893, and has frequently appeared in the lecture field. His works deal principally with Southern scenes, and those largely of the period before and during the Civil war. Among his published books are: *In Ole Virginia* (1887); *Two Little Confederates* (1888); *On Newfound River* (1891); *The Old South* (1891); *Among the Camps* (1891); *Elsket, and Other Stories* (1892); *The Burial of the Guns* (1894); *Marse Chan* (1896); *The Old Gentleman of the Black Stock* (1896); *Two Prisoners* (1897); *Red Rock* (1898); *Gordon Keith* (1903). E.E.T.

PAGE, WILLIAM, an American painter; born in Albany, N. Y., Jan. 23, 1811. He received

his education in New York. He forsook an incipient study of law for art, and became a pupil of S. F. B. Morse, first president of the National Academy, where he gained a silver medal. At the age of 17 he embraced Presbyterianism, and, determining to devote himself to the ministry, went to Andover, and later to Amherst, Mass. A short experience in these seminaries led him to return to New York and take up painting again. He spent a year in Albany, painting portraits, and then settled in New York, where he was admitted a member of the National Academy. Later he went to Boston, and afterward to Florence and Rome, in which cities he lived 11 years. He painted portraits of Gov. Marcy and J. Q. Adams, and among his other works are: *The Infancy of Henri Quatre*, *The Flight into Egypt*, etc. He died in Tottenville, N. Y., Oct. 1, 1885. E.E.T.

PAGET, Sir Augustus Berkeley, a British diplomatist; born in 1823; became précis writer to the late Earl of Aberdeen in 1846; attaché to the embassy of Paris the same year; and secretary of legation at Athens in 1852. After filling diplomatic offices in Egypt, Holland and other countries, he was on several occasions *chargé d'affaires* at Lisbon; minister to Saxony in 1858; to Sweden and Norway in 1859; to Portugal in 1866; and to Italy in 1867. In March, 1876, he was nominated ambassador to Italy, and shortly afterward was sworn of the privy council. Sir A. Paget succeeded Sir Henry Elliott as British ambassador at Vienna, Jan. 1, 1884, and retired on a pension, July 1, 1893. He edited *The Paget Papers* of his father, Sir Arthur Paget. He died July 11, 1896.

PAGET, Sir George Edward, a British physician; born in Yarmouth, England, in 1809; educated at the Charterhouse and at Cambridge; took his B.A. degree in 1831; became Fellow of Caius in 1832; M.D. in 1838. In 1872 he was appointed regius professor of physic in Cambridge, and was knighted in 1885. He may well be regarded as a public benefactor, as having taken the principal part in the great advance that has been made in medical education. He died Jan. 29, 1892.—His brother, Sir James Paget, Bt., was born in Yarmouth, Jan. 11, 1814; studied at St. Bartholomew's Hospital, London; became a member of the Royal College of Surgeons in 1836; honorary fellow in 1843; member of the council in 1865; president of the college in 1875; Croonian lecturer (heart) in 1857; delivered the Hunterian oration in 1877; Bradshawe lecturer in 1882; Morton lecturer (cancer) in 1887; sergeant-surgeon to the queen, surgeon to the Prince of Wales and consulting surgeon to St. Bartholomew's Hospital. He was created a baronet in 1871, and in the same year received the degree of LL. D. from the University of Edinburgh. His two standard works are *Lectures on Surgical Pathology* and *Clinical Lectures*. He was vice-chancellor of the University of London and a member of the Institute of France (Academy of Sciences). Died in London, January 3, 1900.

PAGET, Violet, author; best known by her pen-name of Vernon Lee; was born in Normandy, of English parents, in 1856, and has spent most of her life in Italy. She has written novels, philosophical essays and dialogues, fairy tales, and historical and art treatises on Italy. Her works include *Studies of the Eighteenth Century in Italy* (1880); *Belcaro* (1881); *Ottilie* (1883); *The Prince of the Hundred Soups* (1883); *Euphorion* (1884); *Miss Brown* (1884); *Baldwin* (1886); *A Phantom Lover* (1886); *Juvenilia* (1887); *Hauntings* (1890); *Vanitas* (1892); *Althea* (1893); *Renaissance Fancies and Studies* (1895); *Limbo* (1897), and *Genius Loci* (1900). W.F.J.

PAGO PAGO HARBOR or PANGO PANGO, a seaport on the southeast coast of Tutuila, one of the Samoan Islands, in lat. 14° 19′ S., long. 170° 31′ W. It has an excellent natural harbor; was formerly used as a coaling-station by the United States, and later by Great Britain for the same purpose, but in 1892 was formally ceded to the United States. There is communication by steamer with Sydney and San Francisco.

PAH–UTES. See Piutes, in these Supplements.

PAILLERON, Edouard Jules Henri, a French dramatist; born in Paris, Sept. 17, 1834; began life as a clerk in a notary's office, and published in 1860 a volume of satirical poetry, *Les Parasites*, and a one-act play, *Le Parasite*. Among his most successful productions were *Le Mur Mitoyen* (1862); *Le Dernier Quartier* (1863); *Le Second Mouvement* (1863); *Le Monde où l'on s'amuse* (1868); *Les Faux Ménages* (1869); *Hélène; L'Autre Motif* (1872); *Petite Pluie* (1875); *L'Âge Ingrat* (1878); *L'Étincelle* (1879); *Pendant le Bal* (1881); *Le Monde où l'on s'ennuie* (1881). To the last piece of contemporary satire — for it is rather that than a play — M. Pailleron owed his election to the Academy in 1882. He wrote also *Le Départ; Prière pour la France; La Poupée* (1884); *Théâtre chez Madame; Discours Académiques* (1886); *La Souris* (1887); *Amours et Haines* (1888); *Études sur Émile Augier;* etc. He was made officer of the Legion of Honor in 1889. Died in Paris, April 20, 1899.

PAIN, See Touch, Vol. XXIII, p. 513.

PAINE, John Alsop, an American archæologist; born in Newark, N. J., Jan. 14, 1840. He graduated at Hamilton College in 1859, and at Andover Theological Seminary in 1862. He was ordained in 1867; was engaged by the Board of Regents to enlarge the flora of the State of New York, 1862–67; professor of natural science at Robert College, Constantinople, 1867–69; professor of natural history and German at Lake Forest University, Ill., 1870; associate editor of the *Independent*, 1871–72; archæologist for the first expedition of the Palestine Exploration Society, 1872–73; edited and published the *Journal of Christian Philosophy*, 1882–84; and since 1889 has been curator of the Metropolitan Museum of Art, New York. He has published many archæological reports and magazine articles. E.E.T.

PAINE, John Knowles, an American com-

poser; born in Portland, Me., Jan. 9, 1839. He studied music under Kotzschmar in that city, and made his first appearance as organist in 1857. He studied in Germany under Haupt and others from 1858 to 1861, and made an artistic tour of that country in 1866–67. He was instructor of music at Harvard in 1862–73, and has been professor of music there since 1875. He composed the music for the *Œdipus Tyrannus*, as performed at Cambridge, Mass., in 1881; the cantatas *Nativity; Song of Promise; Realm of Fancy; Phœbus, Arise!;* the choruses for *The Birds*, of Aristophanes; and several symphonies. E.E.T.

PAINE, Robert, clergyman, was born in North Carolina on November 12, 1799, and was licensed to preach in 1818. He became a "circuit rider" of the Methodist Episcopal Church, with a circuit 325 miles in circumference, In 1824 he was a delegate to the first of fifteen general conferences which he thus attended, from 1829 to 1846 he was president of LaGrange College, Alabama, he participated in the division of the M. E. Church, and in 1846 was chosen a bishop of the M. E. Church, South. He died on October 19, 1882. W.F.J.

PAINE, Robert Treat, an American statesman; born in Boston, Mass., March 11, 1731. He graduated at Harvard in 1749 and became a lawyer in Taunton, Mass. In 1770 he conducted the prosecution of Capt. Preston and others concerned in the Boston "massacre." He was a Representative from Taunton to the General Court in 1773–74, and a delegate from Massachusetts to the Continental Congress in 1774–78. In 1777 he was Speaker of the Massachusetts House of Representatives, and attorney-general of the State, and in 1779 a member of the Executive Council and of the committee which framed the State constitution. He was attorney-general again in 1779–90, and a judge of the supreme judicial court, 1790–1804. He died in Boston, May 11, 1814. E.E.T.

PAINE, Robert Treat, 2d, an American author; born in Taunton, Mass., Dec. 9, 1773. He was originally christened Thomas, but had this name changed to that of his father. He graduated at Harvard in 1792, and displayed considerable literary ability, especially in poetry. He entered mercantile life, but soon quitted the counting-house for the editorial desk. It is said that "he made entries in his day-book in poetry, and once made out a charter-party in the same style." In October, 1794, he started a semi-weekly newspaper called the *Federal Orrery*, and at the same time contributed verses to the *Massachusetts Magazine*. Subsequently he wrote dramatic criticisms, and in February, 1795, married Miss Baker, an actress, a proceeding which resulted in family estrangement and social ostracism. A poem on *The Invention of Letters* produced a sum of $1,500, or over $5 a line, and another, on *The Ruling Passion*, yielded him $1,200. For the song of *Adams and Liberty*, he received $750, or $11 a line. He practised law for a short time, but dissolute habits caused his death in Boston, Nov. 13, 1811. E.E.T.

PAINE, William Henry, an American soldier and civil engineer; born in Chester, New Hampshire, May 27, 1828. He received a common school education, then took up the study of civil engineering and removed to Wisconsin, where he began his career as a land surveyor. In the Civil War he was appointed captain of engineers on the staff of General McDowell. After the war he removed to New York where he assisted in the construction of the Brooklyn bridge. For a time he exercised entire supervision of the work and from the date of its completion until 1889, was consulting engineer. The construction of cable railways in various cities and the building of the Port Huron tunnel occupied him during his latter years. He died in Cleveland, Ohio, December 31, 1890. W.M.C.

PAINESVILLE, a village and the capital of Lake County, northeastern Ohio, on Grand River, three miles from Lake Erie, about 30 miles E. of Cleveland, and on the Lake Shore and Michigan Southern, New York, Chicago and St. Louis and the Pittsburg and Western railways. It is the center of an agricultural and fruit-growing section, and has an extensive nursery and manufactories of steam-engines, machinery, metallic oilcloth bindings, sash and blinds, flour and leather. The village is the seat of Lake Erie Female Seminary, a non-sectarian institution chartered in 1856; has a bank with a capital of $200,000, two libraries, one daily and three weekly papers. Population 1890, 4,755; 1900, 5,024.

PAINT. See Pigments, Vol. XIX, pp. 94–97.

PAINTED GOOSE or EMPEROR-GOOSE. See Goose, Vol. X, p. 692.

PAKENHAM, Sir Edward, a British soldier; born at Pakenham Hall, Westmeath, Ireland, March 19, 1778; the second son of the Earl of Longford and a brother-in-law of the Duke of Wellington. He entered the British army in 1794, fought with distinction in Spain, and particularly at Salamanca, where he carried off the honors of the day. In 1814 he was given command of the large force of British regulars which operated against New Orleans. Here he was opposed by General Andrew Jackson with a number of Mississippi and Tennessee militia. In the brief campaign which followed, Pakenham was entirely out-maneuvered and was killed in the battle, Jan. 8, 1815.

PAKTONG or PACKFONG. See German Silver, Vol. X, p. 401.

PALÆOTHERIUM (Gr., "ancient wild beast"), a genus of pachydermatous mammalia whose remains occur in the Eocene beds of England and the Continent. See *Paleotheriidæ*, under Mammalia, Vol. XV, pp. 434, 435.

PALÆOZOIC AGE. See Geology, Vol. X, pp. 291–312.

PALAGONITE-TUFF, usually associated with basalt-lavas; is fine-grained, red, brown and sometimes greenish or yellowish in color. Under the microscope it is seen to be composed of minute fragments of volcanic glass, crowded among which are granules and crystals of augite, olivine, plagio-

clase and magnetite. It occurs in Sicily, the Canary Islands, the Faroe Islands, Iceland and Scotland.

PALAMEDEIDÆ, a family of birds with characters intermediate between the rails and ducks. Huxley included them with the ducks (*Anatidæ*) in the group *Chenomorphæ*. The family includes two genera with three species—all South American. The horned-screamer (*Palamedea*) is the typical genus. See SCREAMER, Vol. XXI, p. 578.

PALANQUIN, an Indian vehicle corresponding somewhat to the Roman litter and the modern European sedan-chair, but, unlike the latter, used for long distances by travelers where railways or good carriage-roads do not exist. It is a wooden box about eight feet long, four feet wide and four feet high, with wooden shutters which can be opened or closed at pleasure, constructed like Venetian blinds. At each end of the palanquin, on the outside, two rings are fixed, and the *hammals*, or palanquin-bearers, of whom there are four, two at each end, support the palanquin by poles passing through these rings.

PALAPTERYX, a genus of fossil birds whose remains are found in the river-silt deposits of New Zealand, associated with the gigantic dinornis, and which, like the dinornis, resembled in the form of the sternum and the structure of the pelvis and legs the living wingless apteryx. Palapteryx, however, seems to have possessed rudimentary wings. See DINORNIS, Vol. VII, p. 212.

PALATAL LETTERS. See HIEROGLYPHICS, Vol XI, p. 712.

PALATE. See DIGESTIVE ORGANS, Vol. VII, p. 193; also ANATOMY, Vol. I, pp. 734, 735.

PALATINE. See COUNTY, Vol. VI, p. 455; also DURHAM, Vol. VII, pp. 483–485.

PALATINE, a village of Cook County, north-eastern Illinois, 26 miles N.W. of Chicago, on the Chicago and North-Western railroad. It is in a dairying and farming district, and has manufactories of sash, blinds and doors, besides flour, planing and flax mills. Population 1890, 891; 1900, 1,020.

PALATINE HILL. See ROME, Vol. XX, p. 840.

PALATKA, a city and the capital of Putnam County, eastern Florida, 35 miles E. of Gainesville, on the St. John's River, and on the Florida East Coast, the Florida Southern, the Gainesville and Gulf and the Jacksonville, Tampa and Key West railroads; has a lumber-mill and a moss factory; cotton, sugar and oranges are shipped here in steamboats, which ply daily between Jacksonville and this place. Population 1890, 3,039; 1900, 3,301.

PALE, IRISH. See IRELAND, Vol. XIII, p. 268.

PALEMBANG, a Dutch residency in SUMATRA, Vol. XXII, p. 673.

PALESTINE, a city and the capital of Anderson County, eastern Texas, about 150 miles N. of Houston, and 181 miles N.E. of Austin, on the International and Great Northern railroad, 10 miles E. of Trinity River. The surrounding country produces cotton, grapes, live-stock and lumber. The city has electric lights, water-works, one daily, one semiweekly and two weekly newspapers; is the headquarters of the railway company; contains a cottonseed-oil mill and compress, a manufactory of brass and iron, brickyards and saw and grist-mills, and has a good trade in hides. Population 1900, 8,297.

PALEY, FREDERICK APTHROP, an English author; born in Easingwold, June 14, 1816. He was educated at Shrewsbury, and St. John's College, Cambridge. He acquired celebrity as an archæologist and classical scholar, having edited Æschylus, Euripides, Hesiod, the "Fasti" of Ovid, Propertius, Theocritus, and the works of other classical writers for the *Bibliotheca Græca* and written a *Manual of Gothic Architecture; Manual of Gothic Mouldings*, and other works and papers on archæology. Having resided in Cambridge from 1860 to 1874, he was appointed professor of classical languages in the Roman Catholic College in London. His books are now almost universally employed in schools and colleges throughout England. He died in Cambridge, September 9, 1888. W.M.C.

PALFREY, JOHN GORHAM, an American author; born in Boston, Mass., May 2, 1796. He graduated at Harvard in 1815, studied theology, and was ordained minister of the Brattle Street church, Boston, in 1818. He was Dexter professor of sacred literature at Harvard, 1831–39; editor of the *North American Review*, 1835–42; member of the Massachusetts House of Representatives, 1842–43; Secretary of the Commonwealth, 1844–48; and Representative in Congress from Massachusetts, 1847–49. He was an acknowledged leader of the Free Soil party. In 1831 he published a *Harmony of the Gospels;* in 1843, *Evidences of Christianity;* and in 1858–64, a *History of New England.* He was postmaster of Boston, 1861–66. He died in Cambridge, Mass., April 26, 1881. E.E.T.

PALGRAVE, FRANCIS TURNER, an English poet, eldest son of Sir Francis Palgrave; born Sept. 28, 1824; was educated at the Charterhouse and at Balliol College, Oxford, where he took his degree of M.A., and was elected to a fellowship at Exeter College. Mr. Palgrave was created an honorary LL.D. of Edinburgh in 1878. On the death of Principal Shairp in 1886, Mr. Palgrave was elected professor of poetry at Oxford. Among his works are *Lyrical Poems* (1871); *Idyls and Songs* (1854); *Essays on Art* (1866); and a *Life of Sir Walter Scott.* He is, however, best known as the editor of *The Golden Treasury of English Songs and Lyrics* (1861), one of the best collections, in compact form, of English verse; of the *Children's Treasury of English Song* (1864); and of the *Treasury of Sacred Song* (1884); of *Shakespeare's Lyrics* (1879); *Tennyson's Lyrical Poems* (1885); *Selections from Wordsworth* (1865); and a *Selection from the Lyrical Poems of Robert Herrick* (1877). He died in London, Oct. 24, 1897.

PALGRAVE, WILLIAM GIFFORD, an English missionary and diplomatist, brother of Francis Turner Palgrave; was born in London, Jan. 24, 1826. He graduated from Trinity College, Oxford, in 1846, taking first-class honors in literature and second-class in mathematics. Soon after completing his university course, he obtained a lieutenant's commission in the Eighth Bombay regiment of native infantry, and went to India.

Becoming converted to Roman Catholicism, he resigned from the army, and was ordained a priest in the Jesuit order, with which he remained connected for fifteen years. He was engaged as a missionary in southern India until 1853, and afterward continued the work for several years in Syria. After the massacre at Damascus, in June, 1861, he returned to France and England and delivered lectures on his experiences in the East, some of which were afterward published under the title, *Four Lectures on the Massacres of the Christians in Syria.* In 1862–63 he made a journey across central Arabia, partly in the interest of the French government, and an account of his adventures was published in his *Narrative of a Year's Journey through Central and Eastern Arabia.* In 1865 he was sent on a special mission to Abyssinia, and later, he filled several consulships —at Soukhoum Kalé, in 1866; Trebizond, 1867; St. Thomas, West Indies, 1873; Manila, 1876, and Bangkok, 1879. In 1884 he was made minister to Uruguay. One of his most important works, is *Essays on Eastern Questions* (1872). He died at Montevideo, Uruguay, Sept. 30, 1888. R.W.C.

PALIKAO, a place on the canal between Pekin and its port, Tientsin, on the Peiho. Here, Sept. 21, 1860, a victory was gained by the Anglo-French troops over the Chinese, and hence the French general, Cousin-Montauban (1796–1878), who was Minister of War in August and September, 1870, received his title of Count Palikao.

PALISADES OF THE HUDSON, a name applied to an escarpment of roughly columnar basaltic trap forming the western wall of the Hudson River for a distance of nearly twenty miles, extending through Rockland County, New York, and Bergen and Hudson counties, New Jersey. This ridge is formed of trap-rock, which in a molten condition, in the Triassic period, gushed forth from between the layers of sandstone and shale belonging to the Newark system. The palisades vary in height from 350 feet, half a mile above Fort Lee, to 550 near their northern end at Indian Head, directly opposite Hastings. The front of the cliff is everywhere precipitous, there being but three breaks sufficiently large to admit of wagon-roads reaching the river. A road runs along the top of the ridge for some distance, and on the inner, or side away from the river, the descent is very rapid into a valley dividing the Palisades from Bergen Ridge.

PALISSOT, DE MONTENOYE, CHARLES, a French author; born in Nancy, January 3, 1730. He was educated at the Congregation of the Oratory, and first attracted notice by his violent hostility to the French philosophers. He wrote the comedy *Le Corde* (1755) in which he satirized Rousseau, and in the following year published a satire on Diderot. This was followed by his famous comedy *Les Philosophes* in 1760. Morellet who wrote an answer to this play was sued for libel by Palissot, and served a term in the Bastile. Palissot's complete works include six octavo volumes. Among them are, *The Dunciad; Little Letters against Great Philosophers; Memoirs for a History of French Literature,* and a *History of the Early Ages of Rome.* He died in Paris, June 15, 1814. W.M.C.

PALIURUS, a genus of trees and shrubs of the family *Rhamnaceæ,* nearly allied to the genus *Zizyphus* but very different in the fruit, which is dry, orbicular and with a broad, membranous wing. *P. aculeatus* is often called Christ's Thorn, from the fancy that it supplied the crown of thorns with which our Saviour was crowned. It is a deciduous shrub or low tree, with slender, pliant branches and ovate three-nerved leaves, each of which has two sharp spines at the base, one straight and the other recurved. It is a native of the countries around the Mediterranean, of India and many parts of Asia. It is often used for hedges in Italy and other countries.

PALK STRAIT, a channel between India and northern Ceylon, connecting Palk Gulf and the Sea of Bengal. At its narrowest point it is 40 miles across. It was named by the Dutch after a governor of Ceylon.

PALLADIUM, a metal. See PLATINUM, Vol. XIX, p. 204; also CHEMISTRY, Vol. V, pp. 465, 466.

PALLICE, LA, a harbor opened in 1889 to receive large Transatlantic and other ocean-going vessels bound for La Rochelle in France, whence it is less than three miles distant. It consists of an inner basin, 28½ acres in extent, and an outer harbor protected by two moles, each 1,380 feet long.

PALLISER, SIR WILLIAM, a British soldier and inventor; born in Dublin, June 18, 1830; entered the army as a cavalry officer, and in 1863 invented the chilled shot that bears his name, and a system of strengthening cast-iron ordnance by the insertion of a steel tube. He retired in 1871; sat in Parliament for Taunton, and was knighted Jan. 21, 1873. He died Feb. 4, 1882.

PALMA, one of the CANARY ISLANDS, Vol. IV, pp. 702, 706.

PALMA RICARDO, a Peruvian author, born in 1833. See PERU, Vol. XVIII, p. 689.

PALMA, TOMAS ESTRADA, educator and statesman, was born at Bayamo, Cuba, and was educated for the bar at the University of Seville, Spain. He was a leader of the Cuban patriots in the Ten Years' War, 1868–78, and became president of the revolutionary republic, but was captured in 1877 and imprisoned. In 1878 he was released, went to Honduras and became postmaster-general. Later he settled in New York state and taught a school for many years. He was Cuban minister to the United States in 1898, and since May 20, 1902, has been president of the Republic of Cuba. W.F.J.

PALMAS, CAPE, West Africa, at the mouth of the Cavally River forming the southwestern boundary of Liberia, is a low promontory projecting into the Atlantic, and marking the division between the Grain Coast and Ivory Coast with their trading settlements. C.L.S.

PALMER, a township in Hampden County, southwestern Massachusetts, 15 miles N.E. of Springfield, on the Chicopee, Swift and Ware rivers, and on the Boston and Albany and the Vermont Central railroads. It comprises the villages of Palmer,

Three Rivers, Thorndike, Bondsville and Duckville, of which the first two are the largest and most important. The township is noted for its manufacturing establishments, there being at Palmer a woolen-mill, yarn-mill, carpet factory, wire-mill and foundry; at Three Rivers a cotton-mill employing over 600 hands and producing annually 9,000,000 yards of cloth; at Thorndike, two mills making plain and fancy tickings and employing 600 hands; and at Bondsville, a mill producing annually 5,000,000 yards of duck and flannel. The village of Palmer has five churches, a weekly newspaper, two banks—national and savings—waterworks, electric lights and fire department. Population 1890, 6,520; 1900, 7,801.

PALMER, Alice Freeman, an American educator; born in Colesville, Broome County, New York, Feb. 21, 1855. She was educated at the University of Michigan, graduating in 1876, and received the appointment of instructor in Latin, Greek and mathematics at Geneva Lake, Wisconsin. In 1877 she became principal of the High School at East Saginaw, Michigan, remaining there until, in 1879, she received the appointment of professor of history in Wellesley College. In 1881 she became acting president of that institution, and in 1882, president. The University of Michigan conferred the degree of Ph.D. upon her in 1882, and she received that of doctor of letters from Columbia in 1887. She resigned in 1887, and was married to Professor George H. Palmer of Harvard in December of that year.

ALICE FREEMAN PALMER.

PALMER, Benjamin Morgan, an American clergyman; born in Charleston, South Carolina, Jan. 25, 1818; educated at the University of Georgia, and the Columbus (Georgia) Theological School. After 1841 he occupied successively pulpits of the First Presbyterian Churches at Savannah, Georgia; Columbia, South Carolina; and New Orleans, Louisiana. The latter place he filled after 1856. Dr. Palmer was commissioner to ten General Assemblies; from 1853 to 1856 he was professor of church history in the Columbia (South Carolina) Theological Seminary; and in 1861 was moderator of the first Southern Assembly, at Augusta, Georgia. He was a founder and editor of *The Southern Presbyterian Review*, and published several theological works.

PALMER, Sir Charles Mark, an English shipbuilder and coal-miner; born in South Shields, in 1822, and educated at a private school. After preparing for a commercial career he entered into partnership with his father, who was a merchant of Newcastle, and others in coal-mining and coke-making, extending the business from small beginnings until the production amounted to 1,750,000 tons per annum. Mr. Palmer introduced the use of steam collier-vessels for the transportation of coal, which have entirely superseded the old sailing-vessels. He also established the ship-yard at Jarrow, where, in 1852, was launched the first screw collier, the *John Bowes*. After that he developed the works into what is now Palmer's Shipbuilding and Iron Company, Limited, where ocean vessels are built from the ore of its own mines, and carried through all stages, from the raw material to the finished vessel. The modern town of Jarrow sprang from these works. Mr. Palmer held many public positions of honor and trust; was elected in 1874 a Liberal member of Parliament, and was three times returned. He was made a baronet in 1886.

PALMER, Erastus Dow, an American sculptor; born in Pompey, N. Y., April 2, 1817. He was a carpenter in Utica, N. Y., until 29 years old, when he occupied his spare time in cameo-cutting, for which he had acquired a taste. He took up his residence in Albany, and at 35 years of age attempted sculpture, to which he thenceforth devoted himself exclusively. His work was almost entirely of original conception, as, at the time of the production of his earlier works, at least, he had never been abroad or studied from the antique. In fact, his first effort at cameo-cutting was a head of his wife, and his first work in marble — a bust of the Infant Ceres — was modelled from one of his own children, and idealized with a strict regard to nature. He died in Albany, N. Y., March 9, 1904. E.E.T.

PALMER, James Croxall, navy surgeon, was born in Baltimore, Md., on June 29, 1811, and was graduated from Dickinson College in 1829 and from the medical department of the University of Maryland in 1834. He was a member of the Wilkes exploring expedition, served in the Mexican War, and in 1857 was on the *Niagara* which laid the first Atlantic cable. At the outbreak of the Civil War he was the head of the Naval Academy upon its transfer to Newport. In 1863–64 he was fleet surgeon with Farragut, and at the great battle of Mobile Bay went aboard the captured Confederate ram *Tennessee* and set the broken leg of its commander, Admiral Franklin Buchanan. He was in active service until 1877, and died on April 24, 1883. W.F.J.

PALMER, John McCauley, statesman, was born at Eagle Creek, Ky., on September 13, 1817, removed to Illinois in order to live in a free state, and became a lawyer. In 1843 he was elected a probate judge, in 1847 a member of the state constitutional convention, in 1849 a county judge, and in 1852 a State Senator. Thus far he had been a Democrat but he left that party because of the Kansas-Nebraska bill and was one of the organizers of the Republican party. In the Civil War he was a major-general of volunteers. From 1868 to 1872 he was governor of Illinois, as a Republican,

GEN. J. M. PALMER.

but in 1872 became a Democrat again. He was U. S. Senator from 1891 to 1897, being the first Democratic Senator from Illinois since Douglas. In 1896 he was the Presidential candidate of the "Gold Democrats." He died on Sept. 25, 1900. W.F.J.

PALMER, JOHN WILLIAMSON, an American author; born in Baltimore, Md., April 4, 1825. He graduated in medicine at the University of Maryland in 1847. He travelled extensively in Hawaii, China, and the East Indies, and was naval surgeon during the second Burmese war, 1851–52. During the Civil war he was a Confederate war correspondent of the *New York Tribune*. He was later a member of the editorial staffs of the Century and the Standard dictionaries, and a contributor to magazines. He is the author of *The New and the Old* (1859); *Up and Down the Irrawaddi* (1860), etc. E.E.T.

PALMER, RAY, clergyman and author, was born at Little Compton, R. I., on November 12, 1808, and was graduated from Yale College in 1830. He was licensed to preach in 1832, from 1835 to 1850 was pastor of a Congregational Church at Bath, Maine, and then for sixteen years of a church at Albany, N. Y. Thereafter for twelve years he was secretary of the Congregational Union. At the end of that service he gave his attention to literary work, and became the author of many books in prose and poetry. As a hymn writer he was one of the most gifted men of his time, some of his hymns, such as *My Faith Looks Up to Thee*, being sung the world around. He suffered a stroke of paralysis in 1885, and died on March 29, 1887. W.F.J.

PALMER, SIR ROUNDELL. See SELBORNE, in these Supplements.

PALMER, THOMAS WITHERELL, an American merchant and statesman; born in Detroit, Michigan, Jan. 25, 1830; was educated at the University of Michigan, and engaged in the real-estate and lumber trade. He served in the state senate in 1878; was defeated for Congress in 1876, and in 1883 became United States Senator. Afterward he served as minister to Spain. In June, 1890, Mr. Palmer was elected president of the national commission having charge of the World's Fair in 1893.

PALMETTO, a common name given to certain palms of the southern United States, notably *Sabal Palmetto*, the cabbage palmetto; *S. serrulata*, the saw palmetto, with spiny-margined petioles; *S. Andansonii*, the dwarf palmetto; and *Chamærops hystrix*, the blue palmetto. The first is a tree, and the southern palmetto of ordinary reference; the others are low forms.

PALMIERI, LUIGI, an Italian meteorologist: born in Faicchio, Benevento, April 22, 1807. He was educated at Cajarro and Naples. He then filled the post of professor of mathematics at the University of Salerno, then at Campabosso and later at Avellino. In 1845 he became professor of physics at the Royal Marine School at Naples, and in 1847 at the University of Naples. In 1854 he was appointed head of the Meteorological Observatory at Vesuvius. He invented several new instruments, notably an electrical seismograph. He wrote various monographs, papers and reports, of great value to astronomical science. The most important of these is an account of the eruption of Vesuvius in 1872. He died in Naples, Italy, September 10, 1896. W.M.C.

PALMIERI, MATTHEW, an Italian historian and philosopher; born in Florence, in 1471. He published a poem *Citta Divina* in which he advanced the theory that the souls of human beings are those angels which in the revolt of Lucifer neither preserved their allegiance to God, nor joined with that apostate, and in consequence were sent hither to pass through a probationary state. This poem was condemned to be burned. He also wrote *Cronoca Generale* (1449), and *A Treatise on Civil Life* (1453). He died in Florence in 1475. W.M.C.

PALMISTRY OR CHIROMANCY, the pretended art of discovering human character and divining personal history by a fanciful interpretation of certain varying lines and irregularities found upon the palm of the hand, usually the left. Aristotle regarded it as a science worthy of approbation; the Emperor Augustus practiced it, and the art was sanctioned by the early and mediæval Church; while its great antiquity is proven by the records of Brahmans in India. The important features of the palm upon the character of which divination is founded are: (1) *The line of life*, curving from the basal joint of the forefinger round the ball of the thumb as far as the wrist-joint. When regular and deeply colored, this line indicates a long and "happy" life, subject to such modifications as are foretold by cross-markings and connected furrows; (2) *the line of health*, running across the hand; (3) *the line of fortune*, from the forefinger to the little finger, it being important that these markings should be clear and unbroken; (4) the fleshy projection at the base of the thumb, technically called the *mountain of Venus*; (5) that at the base of the forefinger, the *mountain of Jupiter*; (6) of the middle finger, the *mountain of Saturn*; (7) of the ring finger, *mountain of the Sun;* and (8) of the little finger, *mountain of Mercury*—all indicating various dispositions and traits of character according to their respective prominence. Even the markings of the finger-nails are supposed to possess an occult significance, and certain minute lines above the finger-joints are made to augur the most fantastic destinies. The votaries of the art have sought to elevate it to the rank of an exact science; but, save among the gypsies and their dupes, this method of divination is now properly relegated to the obscurity to which other vagaries of mediævalism have been consigned.

PALMITIC ACID, occurs as a glyceryl compound in a large number of fats and oils. Is a solid at ordinary temperatures, insoluble in water, but may be dissolved in boiling alcohol or ether. Along with stearic acid it forms the bulk of the so-called "stearine" candles.

PALM-OIL, a heavy oil, mostly obtained for commerce from certain African species, and exten-

sively used in the arts for soap, candles, glycerine, etc.

PALM-SUGAR OR JAGGERY. See SUGAR, Vol. XXII, p. 661.

PALM WINE, the sap of several palms. *Caryota ureus* of India will yield a gallon a day for a month. When fresh it is known as "toddy," but it soon ferments and becomes intoxicating; when distilled it becomes arrack—the gin of India. Palm wine is also made in South America. W.R.B.

PALMYRA, a city and the county seat of Marion County, Missouri, in the northeastern part of the state, 105 miles northwest of St. Louis and near the Mississippi River. It is reached by the Hannibal and St. Joseph railroad and is the center of a rich agricultural region. It has also considerable industries, including packing houses, flour mills, brick and tile yards, carriage factories, etc., and is the seat of a number of academies and colleges, including a Methodist preparatory school, a Roman Catholic College, a college for women, and a Protestant Episcopal College. Its population in 1890 was 2,515, and in 1900 was 2,323. W.F.J.

PALMYRA, a village of Wayne County, New York, in the northwestern part of the state. It is twenty-two miles east of Rochester, and is reached by the New York Central and Hudson River and the West Shore railroads, and by the Erie canal. It is an agricultural center, but has also some manufacturing industries and commerce, and had in 1900 a population of 1,937. W.F.J.

PALMYRA PALM, a name given to *Borassus flabelliformis*, an Asiatic palm, whose sugar-containing sap is one of the palm-wines from which *arrack* is distilled.

PALO ALTO, a town of Santa Clara County, California, in the western part of the state. It is pleasantly situated at the southern end of San Francisco Bay, 28 miles south by east from San Francisco, on the line of the Southern Pacific railroad. It is best known as the seat of the Leland Stanford, Junior, University (q. v., in these Supplements), which was founded in 1891 and which in 1904 had 130 instructors, 1,400 students, and 80,000 volumes in its library. The town of Palo Alto, apart from the university, had in 1900 a population of 1,658. W.F.J.

PALO ALTO, near Matamoros, in Hidalgo County, Texas, in the extreme southern part of that state, was the scene of one of the early battles of the Mexican War, in which, on May 8, 1846, the Americans under General Taylor were victors over a much larger force of Mexicans under General Aristas. W.F.J.

PALOLO, an annelid. See POLYNESIA, Vol. XIX, p. 433.

PALPITATION OF THE HEART. See HEART, Vol. XI, p. 494.

PAMIR PLATEAU. See TURKESTAN, Vol. XXIII, p. 673; also ASIA, Vol. II, p. 599.

PAMLICO SOUND, North Carolina, a shallow body of salt water extending along the low shores of the counties of Carteret, Pamlico, Hyde and Dare, and separated from the Atlantic by a chain of narrow sandy islets scarcely one mile in width, the westernmost point of the central one forming Cape Hatteras, and the southernmost point being Cape Lookout. The sound, entered through Ocracoke and Hatteras inlets, is 80 miles long, from 8 to 30 miles wide, and connects on the north with Albemarle Sound. C.L.S.

PAMPAS. See AMERICA, Vol. I, p. 625.

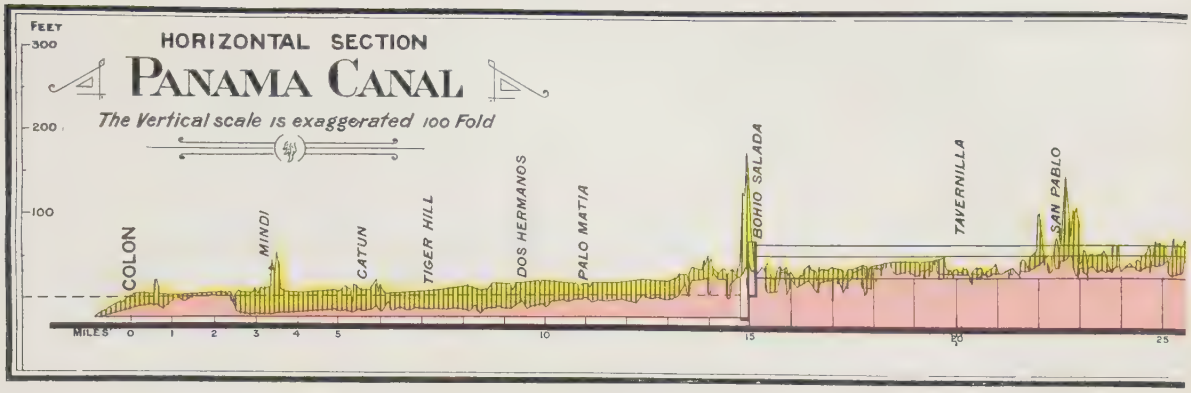
PAMPAS-GRASS. See *Gynerium*, under HORTICULTURE, Vol. XII, p. 258.

PANA, a city of Christian County, southern central Illinois, 42 miles S.E. of Springfield and 35 miles S.W. of Decatur, on the Illinois Central, the Baltimore and Ohio Southwestern and the Cleveland, Cincinnati, Chicago and St. Louis railways. It is situated in a mining region, is an important center of trade, and has railroad car-shops, planing and flour mills, grain-elevators, several churches, banks, two daily and two weekly newspapers. Population 1890, 5,077; 1900, 5,530.

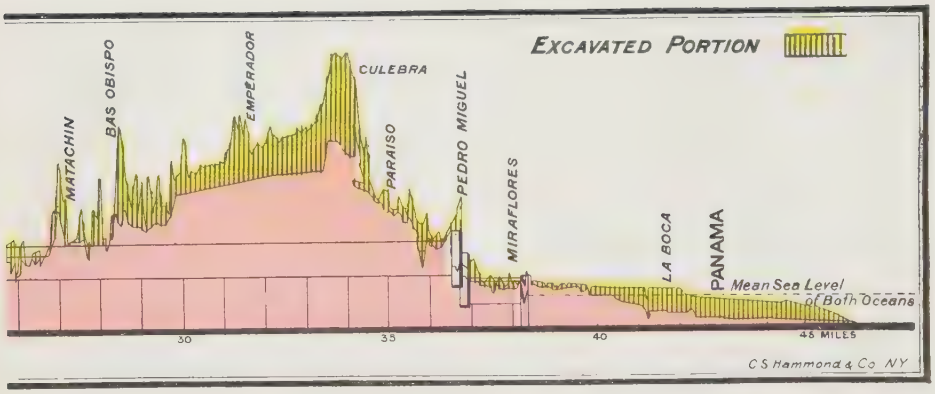
PANAMA, known as the Isthmus of Panama and up to its declaration of independence, November 3, 1903, a state or department of the Republic of Colombia, after which time it became a self-governing republic. On its separation from Colombia, the revolutionary junta issued a manifesto reviewing the little consideration the Colombian government had given the industrial and intellectual development of the inhabitants of Panama, the latter's large fiscal remittances, the grievances they had borne for the sake of harmony and the union, and their forbearance as long as there was any hope of improvement or effective progress under Colombian rule; but, it says in effect, when it became evident that this unjust policy of disregarding Panama's interests was to continue, as demonstrated by the rejection of the Hay-Herran Canal Treaty, —which action was due largely to the alleged fact that Panama would be the only part of the country to receive direct benefit from an inter-oceanic canal—they felt justified in asserting their independence and self-sovereignty, in order that they might work out their own destiny and improve their natural opportunities by negotiating for themselves.

The newly-formed republic has an area of about 32,000 square miles and an estimated population of 285,000, including an independent tribe of Indians numbering about 8,000. Of this population Panama City, the capital and chief town, contains (1903) between 25,000 and 30,000. See PANAMA, Vol. XVIII, pp. 212, 213.

PANAMA CANAL. In May, 1879, an international congress was convened in Paris by M. Ferdinand de Lesseps, to discuss the plan of cutting a canal through the Isthmus of Panama. A plan previously prepared by M. de Lesseps was adopted, the necessary franchise from the United States of Colombia was secured and work on the canal was begun Feb. 28, 1881. Money from stocks and bonds was expended in the enterprise until the Company was forced into liquidation Jan. 1, 1889, when its indebtedness approximated $350,000,000, and perhaps a fifth of the real work done. It was found that only about half the money had been



C A R I B B E A N
MOSQUITO GULF
PACIFIC OCEAN
COSTA RICA
CHIRIQUI
VERAGUAS
COCLE
HERRERA
LOS SANTOS
PANAMA
ISTHMUS OF PANAMA
Colon
Panama
Chagres
Porto Bello
Limon
Limon or Navy B.
Chiriqui Bay
Almirante B.
Bocas del Toro
Boca del Drago
Columbus I.
Boca del Toro
Provision I.
Boca del Tigre
C. Valiente
Escudo de Veragua
Pt. Rincon
Pt. Palinada
R. Chiriqui
Gulf of Dulce
Pavon B.
Bay of David
Sevilla I.
Boca I.
G. Parada I.
Burica Pt.
Ladrones Is.
Secas Is.
Contreras Is.
Montuosa I.
Hermosa Pt.
Coiba I.
Medidor I.
Baltasar Hd.
Negrada Pt.
Jicaron I.
Mariata Pt.
Cebaco I.
Montijo B.
Parita Bay
Pt. Liso
Los Santos
Las Tablas
Azuero Pen.
Mt. Grande
Pedasi
Iguana I.
C. Mala
Los Frailes
Guanico Pt.
Puercos Pt.
Pt. Mala
Pt. Pescador
Manzanilla Pt.
Farallon Sucio
Palenque
Gulf of
Nombre de Dios
Portobello
Isla Grande
Bocas del Toro
Bocas Is.
Escudo de Veraguas I.
Mosquito Is.
Swan Is.
Providencia I.
Roncador Bk.
Serrana Bk.
Quita Sueño Bk.
Serranilla Bk.
Misteriosa Bk.
Pedro Bk.
Jamaica
Kingston
Submarine Cable to Kingston
Submarine Cable to San Juan del Sur
Salud
Buenavista
Arraijan
Chorrera
Tabogo I.
Panama Bay
Taboga I.
Chaperon
Bayoneta I.
Pedro Gonzales I.
Pearl Islands
San Jose I.
Sa. Cruz
Chame B.
Chame Pt.
Chame
Coque I.
Penonome
Pueblo Nuevo
or S. Carlos
Anton
Aguadulce
Calobre
Parita
Santiago
Atalaya
Canazas
Palmas
Soná
Montijo
Remedios
Tole
Alanje
Chiriqui
Mt. Barqueta
Mt. Pocoro
Mt. Santiago
Mt. Chiriqui
Mt. Chiriqui Viejo
Catalina Mts.
Minerai
Caldera
Boquerón
David
Bugaba
S. Lorenzo
S. Feliz
Remedios
Tole
Esparta I.
Pto. Nuevo
Pto. Mohin
Blanca Pt.
Limon
Coaita Pt.
Carrita Pt.
Sixola
Sipurio
Mt. Blanco
Almirante
Bocas I.
Roya I.
Canas Gordas


EXCAVATED PORTION
MATACHIN
BAS OBISPO
EMPERADOR
CULEBRA
PARAISO
PEDRO MIGUEL
MIRAFLORES
LA BOCA
PANAMA
Mean Sea Level of Both Oceans
30
35
40
45 MILES
C.S. Hammond & Co. N.Y.

E 78 F 77 G 76 H
NORTH
S E A
Sabanilla
Canoas Pt.
Cartagena
Cano-loro
Baru I.
Rosario Is.
Barbacoas Bay
San Bernardo Is.
Morrosquillo Gulf
Mestizos Pt.
Cispata
Tolu
Zapote
Lorica
S.Bernardo
Fuerte I.
Broqueles Pt.
Tortuguilla I.
S.Geronimo
S.Pedro
Arboletes Pt.
S.Juan Pt.
Savanilla Pt.
Caribana Pt.
C.Tiburon
Acanti
Arenas Pt.
L. Aguila
GULF OF DARIEN
Ldc Pinos
Caledonia Harbor
Escocés Pt.
P.Carreto
Escondido Pt.
Mosquitos Pt.
P.Escondido
Playon Chico
Mulatas Archipelago
San Blas
Chepo
Gulf of Uraba
Arrullo
Turbo
Rio Carepa
Guaragua
Tucuri
Garachine
Garachine Pt.
C.Escarpado
Chepigana
Brava Pt.
S.Miguel Bay
Darien Harbor
Rey I.
Miguel
Pt.Caracoles
Pinas B.
Pt.Pinas
Humboldt B.
C.Marzo
Octavia Rocks
Cruces Pt.
Cupica B.
Cupica
Atrato R.
Truando
Sucio R.
Leon R.
Paya
PANAMA
SCALE OF MILES
0 10 20 40 60 80
Proposed Panama Canal
Panama Railroad
st from E Greenwich 78 F 77 G 76 H

legitimately used for excavation and construction. De Lesseps and others were confronted with serious charges of fraud, creating a general financial scandal throughout France. A reorganization of the Canal Company followed and in 1894 a new issue of stock numbering 300,000 shares was made but after a few years work practically ceased. On Jan. 4, 1902, The Panama Canal Company offered to sell its abandoned works on the Isthmus of Panama, together with all its rights and titles to lands and harbor privileges to the United States for $40,000,000, the valuation put upon the property by the American Canal Commission, appointed in 1901. The Isthmian Canal Act passed at first session of the 57th U. S. Congress and approved June 28, 1902, authorized the President of the United States to accept for and on behalf of the United States said offer of Panama Canal Co. on verification of a "good, valid and unencumbered title" to the property, but contingent on proper concessions from Colombia. Otherwise the Nicaragua route was to be considered. The title being found satisfactory, a treaty was drawn up by Secretary of State Hay, acting for the United States, and Dr. Herran, representing Colombia, Jan. 22, 1903, which provided that the United States should pay Colombia a bonus of $10,000,000 and a perpetual annuity of $250,000 in lieu of the rights and territories granted for the construction and operation of the Canal; Colombia to retain her sovereignty over the Canal strip, about six miles wide. The treaty was duly ratified by the American Congress but was rejected by the Colombians. Thus the matter rested until after the Isthmians declared their independence of the Colombian government, Nov. 3, 1903, and negotiations for the Canal were concluded with the new republic. See also PANAMA, XVIII, 213.

PAN-AMERICAN CONGRESS. The idea of a congress or conference of representatives of the American republics originated in a plan of Henry Clay for a Panama congress, but no steps were taken to bring it about. The convening of such a congress in 1889 was owing to the efforts of James G. Blaine. This conference was meant to include representatives of the republics of the United States, Mexico, Central and South America, Haiti and Santo Domingo, and the Empire of Brazil. It was planned for the purpose of discussing and recommending means of enlarging and regulating business relations, better facilities for communication, and closer relations in matters of international exchange and reciprocity. In conformity with the provisions of an act of the United States Congress of May 24, 1888, the representatives met in Washington, Oct. 2, 1889, but adjourned to November 19th of the same year for the purpose of visiting various portions of the United States before commencing their work. The congress continued without final adjournment for five months, and voted to recommend to the various governments for adoption, among other measures, a uniform commercial coinage, a general plan of legalizing documents, a uniform system of weights and measures, and that all the represented states adopt treaties of reciprocity.

The various American republics, constituting this International Union, held a second conference in the City of Mexico, meeting Oct. 22, 1901, and adjourning Jan. 31, 1902. Seventeen republics, including the United States, were represented by delegates. A number of important treaties were negotiated and among other transactions was the adoption of a protocol declaring that the principle of voluntary arbitration established by the International Peace Conference at The Hague, in 1899, should be considered as American public law. Before adjourning a resolution was passed to the effect that not more than five years should elapse before a third congress be held.

PAN-AMERICAN EXPOSITION. In Jan. 1899, the Legislature of the State of New York passed a special Act incorporating the Pan-American Exposition Company, the design of which was to hold an exhibition in the city of Buffalo, N. Y., from May 1 to Nov. 1, 1901, which should fittingly illustrate the development of the Western Hemisphere during the 19th century by a display of the arts, industries, manufactures, and the products of the soil, mine, and sea. The project has had the cordial endorsement of Congress, which appropriated the sum of $500,000 to be expended on national buildings and exhibits, including among the latter those not only native to the country, but such interesting displays as can be procured from the colonial possessions of the Nation. Exhibits from the chief departments at Washington, and from the National Museum and the Smithsonian Institution, were among the attractions of the Exposition, as well as an array of exhibits from Canada, the West Indies, and the republics of South America. National and State Boards also co-operated in giving practical effect to the project, and a large capital stock was raised in Buffalo (to the amount of two and a half million dollars, exclusive of the National and State appropriations), to carry out effectively the designs of the incorporators. The grounds of the Exposition (350 acres in extent), were beautifully situated in the suburbs of Buffalo, and most attractive were the array of artistic structures in which to house the exhibits, in a landscape setting of great beauty.

The Pan-American Exposition, it was confidently claimed, surpassed former enterprises of the kind in six important features: First, in the electrical effects; second, in the hydraulic and fountain effects; third, in the horticultural, floral, and garden effects; fourth, in the original sculptural ornamentation; fifth, in the color decorations; and sixth, in the court settings. The general style of architecture of the Exposition buildings was a free treatment of the Spanish Renaissance, a compliment to the Latin-American republics, that aided the enterprise by varied exhibits. Some idea of the extent and attractions of the Exposition may be gathered from the following scheme of arrangements: The principal buildings surround a broad and beautiful court in the form of an inverted letter T. The transverse section of this court, known as the Esplanade, runs east and west, and is over 1,700 feet

between the two extremes. The Court of Fountains, which lies to the north, is 500 feet wide and 2,000 feet from north to south. Arriving at the Exposition grounds, the visitor will pass through the beautiful entrance on Lincoln Parkway. Following the broad drive, he will reach the Albright Gallery; to the right he will see the new park shelter and boat house, and crossing the great bridge over the neck of water connecting the lake with North Bay he will get the first glimpse of the New York State building. Continuing north he will come to the Approach and to the Fire Court, and crossing the Triumphal Bridge, which spans the canal between the east and west of the mirror lakes, he will be within the Esplanade. The buildings here seen upon the extreme right are the Government group, consisting of three large structures. On the far left is a similar group, consisting of the Horticulture, Graphic Arts, and Forestry and Mines Buildings. Crossing the Esplanade one approaches the Ethnology building on the right and the Temple of Music on the left. These mark the junction of the Court of Fountains with the Esplanade. On the right and left again are two subordinate courts, known as the Court of Cypresses and the Court of Lilies. The aquatic basin, some two thousand acres in extent, contains numerous fountains, and constitutes one of the prettiest scenic features of the grounds. On the east and west sides of the Court of Fountains are the Manufactures and Liberal Arts Halls, and the Machinery and Transportation Buildings. The Electric Tower, 375 feet in height and built of steel, stands in another broad basin, brightened with fountains. This tower is off the main plaza; east of the tower is the Agricultural Hall and west of it is the Electricity building. In planning the Exposition, the management early decided upon paying to electricity special homage. The progress of electrical science, they properly thought, has been so marked in recent years as to excite the wonder of the scientific world. Buffalo is, perhaps, more than any other city interested in this science, owing to the nearness of Niagara Falls, where the greatest electric power plants are installed. The electrical displays, it was designed therefore, should be a chief feature of the Exposition. On the eastern side of the Plaza was the Stadium, with a sitting accommodation for 10,000 people. On the west was the largest restaurant erection on the grounds. Here was the entrance to the Midway, which occupied a space of 30 acres and had about 3,000 lineal feet of streets. North of the Park were the State and foreign buildings and in the neighborhood were the music gardens. The plans for the Exposition buildings, together with the general landscape work, were made by a board of skilful architects. The officers of the Pan-American Exposition, marshalled by the President, John G. Milburn, and the Hon. W. I. Buchanan, director-general, included besides a body of influential directors, many executive committeemen having the oversight of the buildings and grounds, the exhibits, the department of works, the bureau of transportation, etc., etc. Other gentlemen formed standing committees of the Exposition, while a separate board of management was entrusted with the supervision of the United States Government exhibit. The cost of the Exposition, so far, including buildings, grounds and the Midway, is stated to be $10,000,000. As a great object lesson in modern progress and development in the two continents of North and South America, the Pan-American Exposition was an interesting and instructive attraction marred in its closing days unhappily by the tragic assault on and death of President McKinley.

G. M. A.

PANAS, Photinos, a French surgeon; born in the Ionian Islands, January 30, 1832. He took up his residence in Paris in 1848, became a subject of France and began the study of medicine. In 1860 he was graduated from the Paris School of Medicine and two years later was appointed associate professor and surgeon to the Central Bureau. He was then surgeon at the Bicetre Hospital and later at the St. Antoine Hospital. In 1873 he was decorated by the Legion of Honor. In 1875 he was appointed ophthalmic surgeon at the St. Louis Hospital. He has written a large number of surgical works and numerous papers on medical subjects. W.M.C.

PANCHATANTRA, a collection of very ancient Sanskrit fables, which, having been translated into other languages, have been adopted by modern fabulists. See Sanskrit, Vol. XXI, p. 301.

PANCOAST, Joseph, surgeon, was born in Burlington County, N. J., on November 23, 1805, and was graduated from the medical department of the University of Pennsylvania in 1828. He settled in practice in Philadelphia, in 1831 began to teach classes in anatomy and surgery, and from 1838 to 1874 was a professor in the Jefferson Medical College. He was one of the most eminent surgeons of his day, and was the author of several important operations. One of these was for soft and mixed cataracts, another was the plow and groove or plastic suture for rhinoplasty, a third was for empyema, and others were for strabismus and for the restoration of the voice. He was a voluminous and authoritative writer on surgical topics. He died on March 7, 1882.

W.F.J.

PANCOAST, William Henry, surgeon, son of Joseph Pancoast (q. v.), was born in Philadelphia on October 16, 1835, and was graduated from Haverford College in 1853, and from Jefferson Medical College in 1855. He also studied in London, Paris, Vienna, and Berlin. He settled in Philadelphia, and soon became known as a skilful operating surgeon. During the Civil War he was surgeon-in-chief of the great military hospital in Philadelphia; from 1862 to 1874 he was a demonstrator of anatomy in Jefferson Medical College, in 1867, 1873, and 1874 adjunct professor, and in 1874 he succeeded his father as professor there, and filled the place for many years. He became professor of surgery in the Medico-Chirugical College of Philadelphia in 1886. He died on January 5, 1897. W.F.J.

PANCREAS. See NUTRITION, Vol. XVII, pp. 693–697.

PANCREATINE. See FERMENTATION, Vol. IX, p. 85.

PANDA. See *Ailurus*, under MAMMALIA, Vol. XV, p. 448.

PANDECTS OF JUSTINIAN, a digest of Roman law. See JUSTINIAN, Vol. XIII, 802–803.

PANDORA, a Grecian myth. See ADAM, Vol. I, p. 126.

PANEL SYSTEM. See COAL-MINING, in these Supplements.

PANGENESIS, a theory of reproduction. See BIOLOGY, Vol. III, p. 597.

PANGUITCH, a post precinct and the capital of Garfield County, south southwestern Utah, on Panguitch Creek, a west branch of the Sevier River, about 130 miles S. of Nephi. It is situated in a mountainous region, with fertile valleys. Coal and an abundance of timber are found. Agricultural and dairy products are plentiful. The village has a tannery. Population 1900, 883.

PANICALE, an Italian painter. See MASOLINO DA PANICALE, Vol. XV, p. 616.

PANICS. (For a general understanding of financial crises throughout the world, see BANKING, Vol. III, pp. 274. et seq.). In the United States there have been two or more panics within recent years which were remarkable, not less for certain points of similarity in some of the causes which produced them and in their widespread effects, than for certain other deep-seated elements which mark them as distinctly different in kind.

The panic of Sept. 18, 1873, known as "Black Friday," was mainly a financial one, being a logical outcome of a long period of overtrading, excessive speculation and unwarranted expansion in certain lines of development. The conditions were, moreover, strongly influenced by a depreciated and fluctuating paper currency, concerning which there had been no authoritative assurance of ultimate redemption in coin. The crisis was immediately precipitated by the failure of Jay Cooke and Company, and within a brief period a great proportion of the banks suspended, premium rates for loans advanced enormously, and there was a disruption of the conditions of exchange between different sections, which was long continued. The Redemption Act of Jan. 7, 1875, restored confidence in monetary conditions, and the commercial prosperity during the ensuing 15 years was unexampled. In 1893 a panic came on, which was marked by peculiar features. The state of productive industry seemed at its highest; crops were bountiful; nature had withheld all such disasters as pestilence, famine and fire, nor was the country threatened with war or internal dissensions. The conditions changed within the space of a few weeks; and the monetary stringency and industrial depression which spread over the land were characterized by more disastrous and lasting effects than any hitherto known. In July the decrease in the volume of trade in New York was 15 per cent. In August and September it was nearly thirty per cent; and bank failures and the suspension of commercial houses were of almost daily occurrence. The shortage of payments, as shown by the clearing-houses, was nearly three billion dollars in excess of that for the same quarter in 1892. Before the end of September upward of fifty per cent of the mills and factories in the production of cotton, woolen, leather and knit-goods, pig-iron and other products were closed; and these conditions had undergone little relaxation—if, indeed, they were not intensified—up to the beginning of November, 1896. In the matter of money scarcity, however, the conditions during this period were variable. During July and August of 1893 fully one tenth of the deposits of all banks was withdrawn in the form of bills and hidden away, and the result was a currency-panic. Premiums as high as $25 per thousand were offered by money-brokers in exchange for small bills, and even the Chemical National Bank of New York was unable to furnish the New York Central railroad with the money for its monthly pay-roll. This incident was only one among thousands of a similar nature. In a short time, however, the high premium on currency brought it from its hiding-places, so that early in September it had dropped to one per cent, and soon disappeared entirely. Subsequently there was no real scarcity of money, but in view of the fact that industrial conditions exhibited no tendency toward a healthy improvement, the conservative banks restricted the amount of their loans and made the conditions of security so much more exacting that cash continued to be difficult to obtain.

The cause, or causes, of this period of depression were disputed. But among the more thoughtful students of the situation, there was little difficulty in forming a decided opinion. Similar to the conditions of 1873, speculation had gone to unwarranted lengths; and investments in improvements such as new railroads, Western town and land schemes, and unremunerative projects of all sorts, served to create timidity in many centers.

The people were going at too rapid a pace; and a check sooner or later was inevitable. Added to this was the growing doubt and uncertainty as to what would be the policy of the government in relation to the questions of coinage and the standard of value. Public attention became focused upon the matter in 1893, during the long fight in Congress over the repeal of the silver-purchase clause of the Sherman Bill. The agitation continued, however, and culminated in 1896 in the transformation of the Democratic party into a party whose principal aim was the free coinage of silver at the ratio of 16 to 1. Public credit was at its lowest ebb, and resulted in unparalleled commercial and industrial depression, which condition prevailed until after the election on November 3d. When it was known that the Presidential candidate of the Republican party had been elected, the alteration in the situation was surprising. Not only the nature of the change, but the degree and emphasis of it were marked features. Mills and factories which had been closed down for months, through sheer timidity as to the outcome, started up within a day after the election, with increased numbers of operatives, and prepared to run night and day, that they might complete extensive orders for goods which had been contingent upon

the turn of the election. Money came from its hiding-places, to be deposited in banks, and a much better feeling of confidence prevaded nearly all industrial and financial centers. Within the first week, it was said, more men were actively employed —by over a million in number—than had been at work in the previous week, or for a considerable period. Early in 1897 a slight relapse was felt.

PANINI, an Indian philologist; generally supposed to have been born near Salatura, Punjab, in the 4th century B.C. He is the oldest writer on grammar whose works are extant. His works were the authority for the more modern Sanskrit. His grammar is more a philosophical treatise than a text-book. An edition was published by Bothlingk in 1887. See SANSKRIT, Vol. XXI, p. 306.

W.M.C.

PANMIXIA AND AMPHIMIXIS. See HEREDITY, in these Supplements.

PANOPOLIS, a city of ancient Greece. See EKHMIN, Vol. VII, p. 688.

PANORMUS, same as PALERMO. Vol. XVIII, p. 172.

PANORPIDÆ, scorpion-flies. See INSECTS, Vol. XIII, p. 158.

PANTELEGRAPH, a telegraphic apparatus for reproducing a writing or drawing at a distance. It makes use of a pendulum which carries an iron point over a picture or writing done in an insulating ink on metallic paper. The circuit is broken every time the pendulum passes over the points that are inked. This action is duplicated by a pendulum at the other end of the line, which swings over a paper prepared with a solution of yellow cyanide of potassium, and leaves blue marks corresponding to the original writing.

PANTHEON, temple. See ROME, Vol. XX, p. 849.

PANTHER. See PUMA, Vol. XX, p. 110.

PAOLA, a city and the capital of Miami County, eastern Kansas, 43 miles S.S.W. of Kansas City, Missouri, and about 70 miles E.N.E. of Emporia, on Bull Creek, a north branch of the Marais des Cygnes River, and on the Kansas City, Fort Scott and Memphis, the Missouri Pacific and the Missouri, Kansas and Texas railways. The surrounding prairies are rich in agricultural products, and in the vicinity of the city are found coal, lime, natural gas and oil. The city has carriage-shops, flour-mills, grain-elevators, several banks, two libraries and three weekly newspapers. Population 1890, 2,943; 1900, 3,144.

PAOLO VERONESE. See VERONESE, Vol. XXIV, pp. 187, 188.

PAPACY. See POPEDOM, Vol. XIX, pp. 502–525.

PAPAINE OR PAPAYOTIN, a digestive agent, derived from the juice of the papaw tree (*Carica papaya*). The milky juice is slightly bitter and styptic, and free from tartness. It flows from incisions made in the bark and the green fruits, and is bottled and sent to market, either pure or with the addition of 10 to 12 per cent of alcohol to prevent fermentation. Papaine is a powerful digestive ferment. Its solubility in different fluids allows it to be used in many pharmaceutical preparations. Attention was first called to its peculiar properties by M. Wurtz before the French Academy of Sciences in 1881.

PAPAL ELECTION. See CONCLAVE, Vol. VI, pp. 213, 214; and in these Supplements.

PAPAL STATES. See STATES OF THE CHURCH, Vol. XXII, p. 477.

PAPAVER. See HORTICULTURE, Vol. XII, pp. 255, 259.

PAPAVERACEÆ, the name of the poppy family, which are herbs with milky or colored narcotic or acrid juice, a calyx which falls off when the flower opens, four to ten petals, numerous stamens and a many-seeded pod. The prominent genera are: *Papaver*, one of whose species (*P. somniferum*) yields opium; *Sanguinaria*, the common blood-root; *Argemone*, the prickly poppy of the southwestern United States and Mexico; *Eschscholtzia*, the Californian poppy, a showy plant common in cultivation; *Chelidonium*, the celandine, and *Bocconia*, an ornamental plant cultivated from China.

PAPAW, the common name (Creole origin) of species of *Asimina*, well-known shrubs of the central and southern United States, which bear dull-purple flowers preceding the leaves, and large, oblong, sweetish, pulpy fruits. They belong to the family *Anonaceæ* or custard-apples.

PAPER, wood. See PAPER, Vol. XVIII, pp. 229, 230.

PAPER-HANGINGS. See MURAL DECORATIONS, Vol. XVII, pp. 44, 45.

PAPER NAUTILUS. See CUTTLE-FISH, Vol. VI, p. 651.

PAPINEAU, LOUIS JOSEPH, a Canadian politician; born in Montreal in October, 1789. He was educated at Quebec, and entered the Canadian Parliament in 1814 as a deputy from Montreal, and became Speaker in 1815. He was the Radical leader, and strongly opposed the government. In 1827 he was re-elected to the House, and was rechosen Speaker, but could not take his seat until 1828. He continued to oppose the government in the interests of the French of Lower Canada, and became a leader in the rebellion of 1837, but did not take up arms, and fled to France, whence he returned to Canada under the provisions of the amnesty of 1840. He died in Montebello, Quebec, Sept. 23, 1871.

E.E.T.

PAPUA, a Malayan word signifying frizzled in reference to the hair and sometimes applied as a title to New Guinea. See NEW GUINEA, Vol. XVII, pp. 396–399; and in these Supplements.

PARÁ, a city of Brazil. See PARÁ, Vol. XVIII, p. 237; and BELEM, in these Supplements.

PARA, a small Turkish coin, equivalent, approximately, to one-ninth of a cent in United States money, although its value varies from time to time, on account of the unstable condition of Turkish currency.

R.W.C.

PARABLES. See GOSPELS, Vol. X, pp. 712, 719.

PARABOLA. See CONIC SECTIONS, Vol. VI, pp. 242–244.

PARAÇATU, a town and a river of the same

name, a western affluent of the São Francisco, in western Minas Geraes, Brazil, about 450 miles N.N.W. of Rio de Janiero. It is the center of a region devoted to grazing and to growing coffee and sugar-cane. A considerable trade is carried on with Goyaz and Bahia. Paraçatu was formerly noted for its gold-washings, now almost exhausted. Some diamonds have also been found in the vicinity. Population (communal) in 1896, 46,621.

PARACHUTE. See AËRONAUTICS, Vol. I, pp. 181–183.

PARACLETE OR HOLY GHOST. See GOSPELS, Vol. X, pp. 745, 746.

PARADISE-FISH, a Chinese species of Macropod, the genus *Polyacanthus*, of the acanthopterygian family *Labyrinthici*, often kept in aquaria for its beauty of form and coloring. In the male the colors increase in brilliancy at the pairing-season, and he swims around his wished-for mate, fluttering the long, delicate filaments of the ventral fins, or erecting those of the tail fin like a peacock's train in miniature.

PARADISEIDÆ. See BIRDS OF PARADISE, Vol. III, p. 675.

PARADOX, HYDROSTATIC. See HYDRO-MECHANICS, Vol. XII, p. 457.

PARADOXURUS OR PALM-CIVETS. See MAMMALIA, Vol. XV, p. 442.

PARAGOULD, a town, the capital of Greene Co., Ark, 160 miles N.E. of Little Rock and 10 miles W. of the St. Francis river, on the Paragould and Southeastern, St. Louis, Iron Mountain and Southern and the St. Louis Southwestern railways, in a region producing cotton, corn, the cereals, white and sweet potatoes, fruit, live-stock, and timber; is an important shipping-point, and has large stave factories. Pop. 1890, 1,666; 1900, 3,324.

PARAGUAY, REPUBLIC OF. (For general article, see PARAGUAY, Vol. XVIII, pp. 247–49.) In 1899 the area and population were estimated as follows: Area, about 98,000 square miles; white population, about 530,103, including about 10,000 foreigners of all nationalities. There were besides about 100,000 Indians. The population of the capital, Asuncion, was about 60,000; other towns are Villa Rica, 25,000; Concepcion, 15,000; San Pedro, 8,000; Luque, 8,000, including their districts.

Education is free and compulsory. In 1887 only 20 per cent of the Paraguayans and 60 per cent of adult foreigners could read and write. There were, in 1897, 390 public and private elementary schools, with 25,000 pupils and 700 teachers. In 1887 there were only 138 schools, with 15,180 pupils. There are, besides, over 100 schools subsidized by the Council of Education; and at Asuncion there is a national college, with 15 professors and 205 students.

In Asuncion there is also a public library, and five newspapers are published in that city.

A high court of justice and various inferior tribunals, with local magistrates, exercise judicial functions.

FINANCE. The revenue of Paraguay in 1900 amounted to a total of $9,866,000. Of this sum about $5,080,622 was derived from customs, $500,000 from sales of land and yerbales, and $12,653 from the rent of government lands. The expenditure amounted to $8,122,139. The foreign debt on Jan. 1, 1901, was about $4,827,500. The internal debt at the same time was $12,454,660.

In 1898 gold was at about 660 per cent premium.

PRODUCTION AND INDUSTRY. The number of horned cattle in Paraguay in 1899 was 2,283,000; horses, 182,790; mules and asses, 7,626; sheep, 214,060; goats, 32,324; pigs, 23,900. Only 158,100 acres were under cultivation in 1887; viz., maize, 58,800 acres; manioca, 41,400 acres; sundries, 8,800 acres. There were about 1,200 factories, tanneries, mills, and houses of business, with an aggregate working capital of $4,550,000, giving employment to 2,600 persons. The chief industry is the growing of *yerba maté*, or Paraguay tea.

COMMERCE. The total value of imports from all directions in 1899 was $2,147,839 (in gold); exports, $2,021,023 (in gold); in 1888, imports $3,198,168, exports $2,183,381; in 1890, imports $2,725,611, exports $2,901,589. The chief imports are textiles.

The imports pass entirely through Brazil and Argentina, and there is no direct intercourse between Paraguay and the United States or Europe.

COMMUNICATION. In 1900, 596 vessels, of 68,075 tons, entered the port of Asuncion.

There is a railway of 157 miles, now in English hands. In 1900 the receipts were 1,568,037 paper pesos; 624,741 passengers were carried, and 50,774 tons of goods. A concession was granted in 1887 for the extension of the railway. There is a line of telegraph at the side of the railway. The national telegraph connects Asuncion with Corrientes, in Argentina, and thus with the outside world. There are 360 miles of telegraph line; and in 1897 52,964 messages were sent. The telephone is in operation at Asuncion. Paraguay joined the postal union in 1881. In 1899 there were 139 post offices; letters sent and received, 1,254,800.

PARAGUAY RIVER. See BRAZIL, Vol. IV, pp. 200, 210.

PARAGUAY TEA. See MATÉ, Vol. XV, p. 633; and AQUIFOLIACEÆ, in these Supplements.

PARAHYBA-DO-SUL. See BRAZIL, Vol. IV, p. 200.

PARALEPIDIDÆ, a family of small fishes found in the deep waters of northern seas. There are few species. They are of no economic importance.

PARALLELOGRAM. See MENSURATION, Vol. XVI, p. 19.

PARALLELOGRAM OF FORCES. See MECHANICS, Vol. XV, p. 709.

PARALLELOPIPED, a solid figure having six faces, the faces being invariably parallelograms, and any two opposite faces equal, similar, and parallel. If the faces are all squares, and consequently equal, the parallelopiped becomes a cube.

PARALLELS OF LATITUDE. See GEOGRAPHY, Vol. X, p. 176.

PARAMAGNETIC SUBSTANCES. See ELECTRICITY, § 60, in these Supplements.

PARAMATTA. See PARRAMATTA, Vol. XVIII, p. 326.

PARAMECIUM OR SLIPPER ANIMALCULE, an infusorian common in pond-water or in vegetable infusions. In shape it is an asymmetrical oval, in length about one hundredth of an inch. Each paramecium is covered with rows of cilia, which lash it through the water and drive food-particles into an aperture which serves as a mouth. A paramecium often divides transversely into two; these two repeat the process, and rapid multiplication may thus proceed for a while. It has its limits, however, and then two individual infusorians conjugate, exchange some of the material of their micronuclei and separate, when division again ensues. Illustrations of the various stages in the life-history are given under *Ciliata*, in PROTOZOA, Vol. XIX, pp. 886–889.

PARAMETER. See CONIC SECTIONS, Vol. VI, p. 242.

PÁRAMITAS. See LAMAISM, Vol. XIV, 227.

PARANÁ, a town and the capital of the province of Entre Rios, eastern central Argentine Republic. It stands on a high bluff, forming the east bank of the Paraná, overlooking the Paraná, nearly opposite Santa Fé, 245 miles N.W. of Buenos Ayres. The town was the capital of the Confederation from 1852 to 1861; afterward it sank rapidly, but within recent years has had a marked increase in growth, and in 1901 had a population of 25,000.

PARANA, a river. See PLATE, Vol. XIX, 199.

PARAPET. See ARCHITECTURE, Vol. II, p. 412; and FORTIFICATION, Vol. IX, pp. 371–379.

PARAPLEGIA. See PARALYSIS, Vol. XVIII, p. 260.

PARA RIO. See BRAZIL, Vol. IV, p. 198.

PARASALENÆ OR MOCK MOONS. See HALO, Vol. XI, pp. 355–357.

PARASANG. See *Persia*, in WEIGHTS AND MEASURES, Vol. XXIV, p. 518.

PARASITES. See PARASITISM, Vol. XVIII, pp. 262–276; and ECOLOGY, in these Supplements.

PARCÆ. See FATES, Vol. IX, p. 44.

PARDESSUS, JEAN MARIE (1772–1853), a French jurist. See SEA LAWS, Vol. XXI, p. 612.

PARDO, DON EMANUEL. See PERU, Vol. XVIII, p. 692.

PARDOE, JULIA, an English authoress; born in Beverley, in 1806. She published poems and a novel in her fifteenth year, and *Traits and Traditions of Portugal* in 1833. A visit to Constantinople in 1836 led to her *City of the Sultan*, after which she made other interesting journeys and published accounts of them. Died in London, Nov. 26, 1862.

PARDON, in law, is the remission of the penalty inflicted on an offender who has been tried and convicted, and is an act of grace rather than of justice. The right should be used with great discretion in rectifying an obvious miscarriage of justice, or where, through the inevitable imperfection of all laws, individual cases or offenses seem to be visited with too severe a penalty. The power of pardoning crime is, by the constitution and laws of most of the states of the American Union, conferred upon the governors of the respective states. In the following states, however, the governor is assisted by an executive council, when the question of pardon is to be decided: Maine, Florida, Louisiana, New Hampshire, New Jersey, North Carolina and Vermont. In Pennsylvania the governor grants pardons only on the recommendation of a board of pardons. In Illinois also a board of pardons is invested with the power. See also PARDON, Vol. XVIII, pp. 276, 277.

PAREGORIC OR PAREGORIC ELIXIR, the compound tincture of camphor of the pharmacopœia. It consists of an alcoholic solution of opium, benzoic acid, camphor and oil of anise, every fluid ounce containing two grains each of opium and benzoic acid and one and a half grains of camphor. This preparation is much used, both by the profession and the public. It has been found useful in chronic rheumatism, and, especially in the case of children, to relieve slight pains in the stomach and bowels.

PAREIRA-BRAVA, a lofty climbing shrub indigenous to the forests of Peru and Brazil, and bearing bunches of oval berries resembling grapes. The plant yielding the root of commerce is the *Chondrodendron tomentosum*, which has a long branching woody root, of a yellowish to a greenish brown color internally, and has attained considerable reputation in medicine.

PARELLA, a name given to some of those crustaceous lichens which are used to produce Archil, Cudbear and Litmus, but which more strictly belongs to one species, *Lecanora parella*, and the red or crimson dye prepared from it.

PARENCHYMA. See BOTANY, Vol. IV, 75.

PARENT AND CHILD. See INFANT, Vol. XIII, p. 3.

PAREPA-ROSA. See ROSA, in these Supplements.

PARESIS. See PARALYSIS, Vol. XVIII, 260.

PARHELIA OR MOCK SUNS. See HALO, Vol. XI, p. 356.

PARIA, GULF OF. See TRINIDAD, Vol. XXIII, p. 610.

PARIAH. See MADRAS, Vol. XV, p. 186.

PARIDÆ. See TITMOUSE, Vol. XXIII, 446.

PARIETAL BONES. See ANATOMY, Vol. I, p. 722.

PARIETAL OR PINEAL EYE. See PINEAL EYE and SENSE-ORGANS, in these Supplements.

PARIMÉ, CORDILLERA OF. See AMERICA, Vol. I, p. 589.

PARIS, CITY OF. (For general article, including map, see PARIS, Vol. XVIII, pp. 278–301.) Since the establishment of the republic the work of improving the city has gone steadily forward. New streets have been opened near the Paris Bourse de Commerce and the Post-office; the Champs de Mars, a waste of sand, has been converted into a beautiful garden, in which rises the Eiffel Tower. The museums of the Jardin des Plantes have been rebuilt; the Quartier Latin has been covered with educational buildings. May 9, 1889, the Paris Universal Exposition was opened in the Champs de Mars. It occupied an area of 173 acres, and in magnitude and comprehensiveness excelled all its predecessors. In 1890–91 two great undertakings were mooted—a system of metropolitan railways to connect the great Parisian stations with the heart of the city, and the conversion of Paris into a seaport by the deepening of the Seine or the construction of a ship-canal to the

Channel. The enthusiastic advocates of the latter scheme predict that in a few years it would make Paris the largest city in Europe and the center of the commerce of the world. No definite steps had been taken in the matter up to the summer of 1896, but its friends still hoped to complete the work in time for the opening of the World's Exposition in 1900. On the 30th of March, 1893, the new Montretout reservoirs were opened, raising the daily water-supply from 150,000 to 270,000 cubic meters. Operations were begun in 1889 for bringing to Paris the water of the river Avre, a tributary of the Eure and a stream of great purity. An aqueduct, 63 miles long, partly under ground and partly above, brings the water to St. Cloud, where a reservoir contains 400,000 cubic meters. One tunnel, at Versailles, is over four miles long. The cost has been 32,000,000 francs. To meet future needs the prefecture is now preparing for a further supply from the Loing and the Lunain.

In the census of 1901 Paris reported a population of 2,660,559.

Paris collects and disburses 350,000,000 francs annually.

	Francs.
Profits from various enterprises, such as markets, gas, water (which pays 12,000,000 francs), street-railways, cabs and other profitable monopolies, paid into the city treasury annually, amount to	40,000,000
Collected from octroi taxes	140,000,000
Direct taxation	35,000,000
Paid from National Treasury	35,000,000
Total	250,000,000

The corporations manufacturing gas must pay the city 200,000 francs a year for the privilege of piping streets, .02 franc a year for each cubic meter supplied, and half the net profit after paying 13½ per cent. on the capital stock of 84,000,000 francs, which stock cannot be watered. The debt of the city of Paris in 1899 amounted to 2,387,216,295 francs (=$477,443,259).

PARIS EXPOSITION (1900). For international exhibitions on a colossal and grandly artistic scale the beautiful French capital can always be trusted to vie with, if not to excel, any other of the world's cities. To those who had the good fortune to see the Exposition of 1900, on the banks of the Seine, with the elaborate arrangements for housing and displaying its array of interesting and attractive exhibits to represent the art, science, agriculture, invention, and manufacture of the chief world-powers, will deem the remark amply justified. In the arrangements for the mammoth exhibition the French commissioners spent money lavishly, as well as expended enormously of energy and labor. The area devoted to the purposes of the Exposition far exceeded that of the year 1889, traces of which remain, in the magnificent Eiffel Tower and other structures; while portions of the park of Vincennes, lying outside the city, were utilized as annexes for the display of the more cumbrous exhibits. Abundant were the facilities for transportation about the grounds, and in some cases ingenious the devices for saving the visitor from undue weariness. But it was in the exhibits themselves, which represented the industry, the invention, or the art taste of the world of to-day, that Paris had most reason to be proud of her great show, whatever illusion her rulers were under as to the effect of the Exposition in promoting peace and good will among the nations. The United States contributed to a marvellous extent to the display and made a most impressive and unique exhibit. Germany, Belgium, Italy, Russia, and Austria, as well as England and her colonies, were also attractively represented, as were China and Japan, and some of the more interesting of Oriental nations. In its educational aspects, and as a means of keenly whetting the intelligent interest and curiosity of visitors in regard to the industrial activities of the age, the Exposition could hardly fail to be of immense advantage, apart from what was claimed for it in abolishing discord among the nations and heralding an era of peace.

The chief commissioner of the 1900 exhibition was M. Alfred Picard, a notable engineer, to whom Paris was greatly indebted for the successful planning and management of the colossal affair, aided by a group of clever artists, contractors, manufacturers, engineers, architects, and other skilled craftsmen. The financial director, acting in unison with the French government and with the Corporation of Paris, was M. Grison; while M. Bonvard was the director of the architectural department, which perhaps more than any other deservedly won praise for the magnificence of the palaces, memorial halls, and pavilions, which housed the exhibits and gave an air of wonderland to the scene. Very remarkable and impressive were the architectural beauties of the Exposition and its grounds. The chief features of note, besides the new Alexander III bridge, and the magnificent vistas of the Champ de Mars, and the Esplanade des Invalides, were the Grand Palace and the "Petit" Palace of Fine Arts, one facing the Avenue Nicholas II, the other forming a continuation of the Alexander III bridge. Finely decorative was the main entrance on the Place de la Concorde, as was the National (Foreign) Pavilions on the Quai D'Orsay, the Palace of the Esplanade, and the Palace of Diverse Industries. Imposing also was the United States Building, on the Quai D'Orsay, which covered nearly 10,000 feet of area, and housed a display of American industry and art worthy of the dignity and high position of the nation. Much of the success of the American exhibit, it ought to be said, was due to the U. S. Commissioner-General, Mr. Ferdinand W. Peck, and his assistant, Mr. B. D. Woodward, aided by the services of Mr. Fred Brackett, the U. S. Secretary and disbursing agent. Highly to be commended also were the skill, enterprise, taste, and patriotism of the array of American exhibitors, including, besides manufacturers, machinists, and inventors, many sculptors, artists, scientists, and artistic craftsmen, whose splendid exhibits did honor to the nation. Other foreign countries also made a large and fine showing at the Exposition, notably Germany, Russia, Austria-

Hungary, Italy, Belgium, Spain, and Switzerland. Great Britain was not prominent in her displays, though her Indian Empire and her colonies, Canada, and Australia, were well represented.

A high compliment was paid the United States in the extent of area afforded by the French authorities to the exhibits of the nation. The location was in almost all instances also favorable. This was particularly noticeable in the prominent positions assigned to the magnificent American exhibits in sculpture as well as in painting. Of the work of our sculptors that was thus honored, the following may be mentioned: Mr St. Gauden's fine equestrian statue of General Sherman; Mr F. MacMonnies' two groups of rearing horses designed for the Memorial Arch in Brooklyn, N. Y.; Mr. St. Gauden's Shaw Memorial, representing "a young officer on horseback among his troops, who press forward to battle, unconscious of the Angel of Death hovering overhead, with her wreath of glory for the brave young hero." The other notable exhibits in sculpture include Mr. Phinnister Proctor's pair of American pumas, "the lions of the Rockies"; Mr. Cyrus E. Dallin's Indian Medicine Man on Indian pony; Mr. MacMonnies' statue of Sir Henry Vane; Mr. G. G. Bernard's God Pan; Mr. Daniel Frenchs' equestrian statue of General Washington; Mr. Rondebush's Wrestlers; and Mr. Paul Bartlett's statue of Michael Angelo, designed for the Congressional Library in Washington.

The position allotted to the United States section of painting was also highly complimentary to our American artists. Among the prominent exhibitors in this department were John S. Sargent, J. MacNeil Whistler, Abbott H. Thayer, G. De Forest Brush, Gari Melchers, Edwin A. Abbey, John W. Alexander, Kenyon Cox, Homer Martin, George Inness, Winslow Homer, Henry B. Snell, William Chase, and Cecilia Beaux. The high appreciation of the achievement of these representative artists was shown practically in the large number of high awards conferred upon their work. G. M. A.

PARIS, a town and the capital of Bear Lake County, extreme southeastern Idaho, near Bear Lake, and ten miles from Montpelier, the nearest railroad station, on the Union Pacific railroad. It is the center of an agricultural, dairying and stock-raising district. Considerable lumber is also obtained in the vicinity. Pop. 1890, 893; 1900, 906.

PARIS, a city and the seat of Edgar County, Illinois, in the center of the eastern border of the state. It is 105 miles east of Springfield, 170 miles south of Chicago, and 18 miles northwest of Terre Haute, Indiana, and is reached by the Cleveland, Cincinnati, Chicago and St. Louis and the Terre Haute and Peoria railroads. It is an agricultural center, an important railroad junction, and the seat of railroad car shops, machine shops, foundries, and numerous other industries tributary to the natural resources of the region. Its population in 1900 was 6,105.

W.F.J.

PARIS, a city and the capital of Bourbon County, northeastern-central Kentucky, on Stoner Creek, 19 miles N.E. of Lexington and 80 miles S.E. of Covington, and on the Kentucky Midland and the Louisville and Nashville railroads. It contains a military institute, has trade in live-stock, whiskey, tobacco, flour and cordage. Pop. 1900, 4,603.

PARIS, a post town and the capital of Oxford County, western Maine, about 50 miles N. E. of Portland, on the Penobscot River, and on the Grand Trunk railroad. It contains the villages of Paris and South Paris, the former has an academy and the latter a cheese factory, foundry, saw and grist mills, and the Oxford Normal Institute. Mount Mica, in the township, has an abundance and variety of minerals. Pop. 1900, 3,225.

PARIS, a town and the capital of Monroe County, Missouri, on the middle fork of Salt River, 25 miles E. of Moberly and 44 miles W. S. W. of Hannibal, on the Missouri, Kansas and Texas railway. It is an agricultural, trade and manufacturing center. Pop. 1900, 397.

PARIS, a town and port of entry of Brant County, southwestern Ontario, Canada, 29 miles W. of Hamilton, on the navigable Grand River, and on the Grand Trunk railroad. It has excellent water-power, which runs woolen, flour, saw and planing mills. In the vicinity extensive gypsum-beds are found. Population 1901, 3,229.

PARIS, a city and the capital of Henry County, northwestern Tennessee, 70 miles W. of Clarksville and 131 miles N. E. of Memphis, on the Louisville and Nashville and the Paducah, Tennessee and Alabama railroads. It has a lucrative trade in tobacco and cotton, contains several factories and mills, and an academy. Pop. 1900, 2,018.

PARIS, a city and the capital of Lamar County, northeastern Texas, 98 miles N. E. of Dallas, and 90 miles W. of Texarkana, on the Gulf, Colorado and Santa Fé, St. Louis and San Francisco and Texas Pacific railroads. It is the trade center and shipping-point of a region producing cotton, grain, fruit and live-stock; has cottonseed-oil, flour, saw and planing mills, cotton-gins and compresses, large fruit cannery, foundries, artificial ice factory, machine-shops, manufactories of furniture, plows and wagons, and other industries. The city is well supplied with banks, schools and newspapers, and is the seat of the North Texan University. Population 1890, 8,254; 1900, 9,358.

PARIS, a genus of plants of the family *Liliaceæ*, of which one species, *P. quadrifolia*, called herb-paris, is common in moist, shady woods in some localities. It is rarely more than a foot high, with one whorl of generally four leaves and a solitary flower on the top of the stem, followed by a berry. The berry is reputed narcotic and poisonous, but its juice has been employed to cure inflammation of the eyes. The root has been used as an emetic.

PARIS, Alexis Paulin, a French historian and philologist; born in Avenay, Marne, March 25, 1800. He was educated at the Collège Rollin and then began the study of law, but soon devoted his entire attention to French history. At the age of 28 he was appointed to an important post in the national library and in 1837 was

made a member of the Academy. He was appointed professor of French literature and language in the Collège de France in 1853, retiring in 1872 to be succeeded by his son Gaston Bruno Paulin Paris (q.v.). He later translated Byron's poems and Moore's *Memoirs of Byron* into French. His principal work was his history of France, published in 1838 in six volumes. He also wrote various other works on French literature and history. He died in Paris, February 13, 1881. W.M.C.

PARIS, Gaston Bruno Paulin, a French philologist; son of Alexis P. Paris (q.v.); born in Avenay, Marne, August 9, 1839. He was graduated from the Collège Rollin and studied in Germany. He lectured on the mediæval language and literature of France at the Collège de France, and in 1872 succeeded his father as professor there. In 1895 he was made a director in the college, and in 1896 he was elected to the French Academy, taking the seat made vacant by the death of Dumas. Having been a pupil at Bonn of Professor Diez, he did much to continue the study of Roman philology which the former had practically founded. His published works include *A Poetical History of Charlemagne* (1866); *Poetry of the Middle Ages* (1885); *French Mediæval Literature* (1888), and several works on philology and French literature. He died in Cannes, France, March 6, 1903. W.M.C.

PARIS, Louis Philippe Albert d'Orléans, Count of, son of the Duke of Orléans and grandson of King Louis Philippe; was born in Paris on August 24, 1838, and was taken to England with the rest of the family at the revolution of 1848. He received a thorough English education, paying attention to military affairs, and then came to America with his brother, the Duke of Chartres, and served on the staff of General McClellan in the Civil War. Down to 1885 he was the Orleanist pretender to the throne of France and the rival of the Count of Chambord, who was the Legitimist pretender, but after Chambord's death in 1885 the Count of Paris became the royalist candidate of both factions. In 1886 he, with the other royalist and imperialist princes, was expelled from France, and went to England again, where the rest of his life was chiefly spent. He was a man of fine character and ability, and was the author of two standard works, *The Trade Unions of England* (6 vols., 1869) and *A History of the Civil War in America* (7 vols., 1874–89). He married in 1864 a daughter of the Duke of Montpensier, who bore him six children. He died in England on September 8, 1894. His eldest son, Louis Philippe Robert, Duke of Orléans, who was born on February 6, 1869, succeeded him in the dubious honor of the royalist pretendership, but has not proved formidable. In 1890 he defied the law of exile and re-entered France in theatrical fashion, to serve in the army, but was merely locked up for a time for his pains, after which he settled at Brussels. W.F.J.

COMTE DE PARIS.

PARIS, Declaration of. See Declaration of Paris, Vol. VII, pp. 20, 21.

PARIS, Matthew of. See Matthew of Paris, Vol. XV, pp. 640, 641.

PARIS, Treaties of. The treaty of 1763, otherwise known as the *Peace of Paris*, was of great consequence to the people of the American continent, in that all the French possessions in North America east of the Louisiana territory were ceded to Great Britain. (See France, IX, 520.)

The treaty of 1814, which has been designated the *First Peace of Paris*, was so called because a second pacification became necessary after Napoleon's return from Elba and his one hundred days of empire. It followed after the overwhelming victory of the allied Prussians, Russians and Austrians over Napoleon at Leipsic, Oct. 16 to 19, 1813. It reduced the dimensions of France to what they were prior to 1792, and provided for the *Congress of Vienna*. (See Congress, VI, 239.)

The treaty of 1815, called the *Second Peace of Paris*, was between France and the allies after Napoleon's final overthrow at Waterloo. It further reduced the territorial limits of France, and provided that a foreign army should occupy French territory at the expense of France.

The treaty of 1856 is treated at length under the title Declaration of Paris (VII, 20.) The attitude of the United States relative to this treaty should, however, be more fully stated, having in 1856, declined to become a party to the declaration, on the ground that inadequate provision was made for the security from capture of private property at sea. That government contended that a neutral flag should cover free goods — that is, that a neutral vessel should not be searched even for contraband of war. In 1861 Secretary of State William H. Seward declared to Great Britain that the United States would abide by the Declaration of Paris, provided that goods of non-combatants were secured from confiscation during maritime war. Earl Russell thereupon made the additional stipulation that such an agreement should have no "bearing, direct or indirect, on the internal differences now prevailing in the United States."

This was a plain statement that England would accord whatever belligerent rights to the Confederacy that she might choose to do, and Mr. Seward terminated the negotiations. He had previously taken the stand that the Confederates were insurgents, and that until they had shown their capacity to maintain their independence it would be a violation of international courtesy for a foreign state to give them recognition. Not only had he declined all offers from the European nations to arbitrate our internal differences, but he had insisted that the only proper resort was for representatives of the Northern and Southern states to settle their disputes in the halls of Congress.

On Nov. 8, 1861, Captain Wilkes took four Confederate commissioners from the deck of an English steamer, and brought them to Fort Warren, in Boston harbor. This was known as the *Trent* Affair. Secretary Seward claimed that the government did not authorize this act, but declared that the existing condition of international law was such that Captain Wilkes should have brought the *Trent* as a prize before an admiralty court. He concluded, however, that, should the British government demand the prisoners, he would consent to a liberal United States interpretation of neutral maritime rights, and relinquish the prisoners, inasmuch as the United States had resisted the right of search since prior to the War of 1812. Yet this concession does not have the force of a treaty, and the United States is not bound to observe any of the terms of the Declaration of Paris, nor are foreign states bound to observe them toward her in case of war between them.

PARIS BASIN, in geology, the area in which the Cainozoic systems of France are best developed.

PARIS GREEN, a cupric aceto-arsenite powder, called also mitis-green, emerald-green, imperial-green, French green, Vienna green, Schweinfurth green, and sometimes Scheele's green, from which it differs in that it contains acetic acid. As a pigment it is fairly permanent, somewhat lacking in body, and is sparingly employed by artists and decorators for the production of a vivid light green color. As an insecticide it is very poisonous, and is extensively used in the extermination of the cotton-worm, the potato-bug and other noxious insects.

PARK, Edwards Amasa, an American theologian; born in Providence, Rhode Island, December 29, 1808. He was graduated from Brown University in 1826 and from Andover Theological Seminary in 1831. He was then ordained pastor of the Congregationalist Church in Braintree, Massachusetts, and in 1835 accepted the chair of moral and intellectual philosophy at Amherst. In 1836 he was appointed professor of moral and intellectual philosophy at Andover and from 1847 to 1881 held the chair of sacred rhetoric in that institution. He then occupied the chair of theology until his death. He died in Andover, Massachusetts, June 4, 1900. W.M.C.

PARK, Roswell, an American physician and surgeon; born in Pomfret, Connecticut, May 4, 1852. He first studied at Racine College and then at Harvard, and in 1876 graduated from the medical department of the Northwestern University in Chicago. From 1879 to 1882 he was adjunct professor of anatomy there. In 1883 he was appointed professor of surgery at the University of Buffalo, and surgeon to the Buffalo General Hospital. He was one of the attendants upon President McKinley after the latter was shot. He has published *Lectures on Surgical Pathology* (1891); *History of Medicine* (1897), and *Text-Book of Surgery* (1896). W.M.C.

PARK CITY, a city of Summit County, Utah, about 30 miles E. of Salt Lake City, on the Utah Central and the Union Pacific railroads. It is an important silver and lead-mining town, and has quartz-mills, sampling-works and saw-mills. Pop. 1890, 2,850; 1900, 3,759.

PARKER, a city and the capital of Turner County, S. D., 23 miles S.W. of Sioux Falls on the south branch of the Vermillion River, and on the Chicago, Milwaukee and St. Paul and the Chicago and North Western rys. It is the trade center of an agricultural district. Pop. 1900, 893.

PARKER, Alton Brooks, jurist; born in Cortland, N. Y., May 14, 1852; acquired a district school education while working on his father's farm; took the course at the Cortland Academy, and then entered the newly-established State Normal School at Cortland. A chance incident in his father's family created a desire to become a lawyer, and to gain means to study at the Albany Law School he began teaching when sixteen years old, first at Virgil, in his native county, and afterward at Binghamton. With his savings he completed the Normal School course; then went to Rochester as principal of one of the public schools; and, when he had saved sufficient money, went to Albany, and was graduated at the Law School, in 1872. He settled in Kingston, entered the law office of Schoonmaker & Hardenbergh, and was admitted to the bar in 1872. About this time he became interested in the work of the Democratic party in Ulster County, with the result that in 1873 he became clerk of the board of supervisors of the county, and in 1877 was elected surrogate for a term of six years, at the expiration of which he was re-elected. Twice his friends urged his name for the nomination for lieutenant-governor, in 1882, when David B. Hill was selected, and in 1885, when the honor went to Gen. Edward J. Jones. In the latter year, at the solicitation of Mr. Hill, then the Democratic nominee for governor, Judge Parker managed the State campaign. The same year he declined the appointment of first assistant postmaster-general; and on the death of Judge Theodore R. Westbrook, of the Supreme Court of New York, in that year, Governor Hill appointed Judge Parker to fill the vacancy. Near the close of this term he was elected to succeed himself. Judge Parker served as a member of the newly-created Second Division of the Court of Appeals of New York by assignment by the governor in 1889–93, and when about returning to his judicial duties in the Supreme Court, Governor Flower designated him as a member of the General Term of the First District in New York, where he served till 1896, when the Appellate Division of the Supreme Court, created by the new constitution, went into operation. In 1891, 1901, and 1903 Judge Parker was urged to allow the use of his name in connection with the nomination for governor, but declined, as he also did when desired to become a candidate for United States Senator after the election of Mr. Hill as governor. In 1897 he was elected chief justice of the Court of Appeals of New York. For several months prior to the National Democratic Convention of 1904 it

was evident that Judge Parker was the choice of a large proportion of his party for the presidential nomination, and when the convention met it gave him the nomination on the first ballot. Immediately afterward he broke his silence as to his political views by sending to the convention a telegram containing the following words: "I regard the gold standard as firmly and irrevocably established, and shall act accordingly if the action of the convention to-day shall be ratified by the people." He was defeated in the following November election. G.J.H.

PARKER, Foxhall Alexander, an American naval officer; born in New York, Aug. 5, 1821. He entered the navy in 1839; and did service in the West Indies, in Florida, on the Lakes, on the Coast Survey, in the Mediterranean, and with the East India and Pacific squadrons. He was executive officer of the Washington navy yard, 1861–62; was commissioned commander, 1862; and commanded the naval battery at Morris Island, 1863. He was commissioned captain, 1866; commanded the Charlestown navy yard, 1869–70, and the European squadron, 1870–71. He became commodore in 1872; was chief signal officer, 1873–76, and superintendent of the Annapolis Academy, 1878–79. He died in Annapolis, June 10, 1879. E.E.T.

PARKER, Horatio Gilbert, Canadian novelist; born at Camden East, Ontario, Canada, Nov. 23, 1862; educated in Canadian and English schools, and at Trinity College, Toronto, where, for a time, he was lecturer on English literature. In 1886 he went to Australia and became associate editor of the Sydney *Evening Herald*, made a voyage about the South Seas, and wrote three dramas — an adaptation of *Faust* (1888); *The Vendetta* (1889); and *No Defence* (1889). In 1890 he settled in London, where he published *Round the Compass in Australia* (1892), and wrote for English magazines and weekly periodicals the series of short tales of Hudson Bay Company life in the Canadian Northwest, that were afterward collected in *Pierre and His People* (1892). Of his narratives were *Mrs. Falchion* (1893); *The Trespasser* (1893); *The Trail of the Sword* (1894); *A Lover's Diary* (1894); and *The Translation of a Savage* (1894), the latter being a London story. His next and more notable ventures were again in the field of a Canadian romance, *When Valmond Came to Pontiac* (1895), a story founded on the conspiracy of the great chief of the Ottawas; *An Adventurer of the North* (1895); and *The Seats of the Mighty* (1896). In these he manifests increased strength and versatility. His latest works are *The Pomp of the Lavillettes*, *The Battle of the Strong*, and *The Right of Way*.

PARKER, Horatio William, an American musician and composer; born in Auburndale, Massachusetts, September 15, 1863. He graduated from the Munich Royal Conservatory in 1885. He has been organist of various churches, and in 1894 was appointed professor of the theory of music at Yale University. His compositions include the oratorio *Hora Novisima*, the first American music given at an English musical festival; *A Wanderer's Psalm*, the oratorio of *St. Christopher* and the cantatas *King Trojan* and *The Kobolds*. W.M.C.

PARKER, Joel, an American jurist and legislator; born in Monmouth County, N. J., Nov. 24, 1816. He was graduated from Princeton in 1839, and was admitted to the bar in 1842. He established a law practice in Freehold, N. J. In 1862 he was elected governor of New Jersey, and was re-elected in 1864, and again in 1870. In 1877 he was nominated for Vice-President by the National Labor party. In 1880 he was appointed associate justice of the Supreme Court of New Jersey, and was reappointed in 1887. He died in Philadelphia, Pa., Jan. 2, 1888. W.M.C.

PARKER, Joseph, an English clergyman and author; born in Hexham, April 9, 1830, and, like Spurgeon, began to preach in early youth. He was ordained pastor of the Congregational Church at Banbury, and then minister of churches in Manchester and London. He visited the United States in 1888. He published a number of works, among which are *Helps to Truth-Seekers* (1857); *Ecce Deus* (1868); and *City Temple Sermons* (1869). Died Nov. 28, 1902.

PARKER, Willard, an American surgeon; born in Hillsboro, N. H., Sept. 2, 1800. He was educated at Harvard, graduating in 1826, after which he studied medicine in Boston, receiving his degree from the Harvard Medical School in 1830. He was subsequently a professor at Berkshire Medical College, Cincinnati Medical College, and New York College of Physicians and Surgeons. He established an extensive practice in New York, taking high rank as a surgeon. He instituted the first college clinic in the United States, at the College of Physicians and Surgeons, in New York City, in 1840; organized the New York Pathological Society in 1843 and the New York Academy of Medicine in 1847. In 1865 he became president of the New York State Inebriate Asylum at Binghampton, holding the office for 20 years. He was a member of leading medical and scientific societies in the United States and Europe. He wrote many valuable treatises on surgery, including *Cystotomy* (1851); *The Nerves* (1856); and *Lectures on Cancer* (1873). He died in New York City, April 25, 1884. W.M.C.

PARKER, William Kitchen, an English naturalist and anatomist; born near Peterborough, Northamptonshire, June 23, 1823. He was educated at Charing Cross Hospital and at King's Hospital College. In 1849 he began the practice of medicine, studied botany and natural history, and was elected a fellow of the Royal Society in 1865. From 1873 to 1883 he was professor of comparative anatomy at the Royal College of Surgeons, London. Although he was deeply interested in biology, he devoted his attention chiefly to the study of comparative osteology and wrote nearly a hundred scientific papers concerning his investigations. These works include *On the Osteology and Systematic Position of Balæniceps* (1860); *The Skull of Batrachia* (1878),

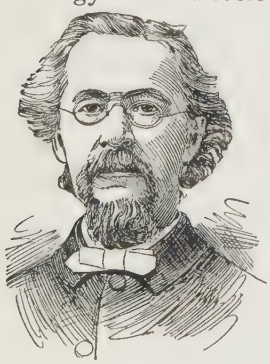
and *Insectivora* (1886). He died in Cardiff, Glamorganshire, Wales, July 3, 1890. W.M.C.

PARKERSBURG, a city of W. Va., about 95 miles below Wheeling, and 12 miles below Marietta, Ohio, on the B. & O., Southwestern and Ohio River railroad. Parkersburg contains a courthouse, 12 churches, several high schools, 4 national banks with a combined capital of over $600,000, gas-works, a fine new building erected by the United States for a post-office and courthouse, 5 oil-refineries, 2 large lumber-mills, 3 iron foundries, 5 machine-shops, chemical-works, boiler-shops and barrel factories. One weekly, one semiweekly and two daily newspapers are published. The city has an extensive trade in oil (petroleum), and a large trade in lumber. Pop. 1890, 8,408; 1900, 11,703. See also PARKERSBURG, XVIII, 307.

PARKES, SIR HENRY, an Australian statesman; born in Stoneleigh, England, in May, 1815; emigrated to New South Wales in 1839, and at Sydney became eminent as a journalist, editing *The Empire* from 1849 to 1856. He was a member of the Colonial Parliament in 1854, and Prime Minister in 1872. Was several times head of the ministry, and identified with the promotion of free trade. He was the representative of New South Wales at the colonial conference in London in 1887, and in 1891 was president of the council for arranging a federal union of the Australian colonies. His most important works are *Australian Views of England* (1869); *Fifty Years of the Making of Australian History* (1893). Died in Sydney, April 26, 1896.

PARKESBURG, a borough of Chester County, Pa., 18 miles W. of Westchester and about 55 miles S. E. of Harrisburg, on the Pennsylvania railroad. Pop. 1890, 1,514; 1900, 1,788.

PARKHURST, CHARLES HENRY, an American clergyman and sociologist; born in Framingham, Mass., April 17, 1842. He was graduated from Amherst College in 1866, went abroad two years later and studied theology at Halle and Leipsic. He taught in the Williston Seminary from 1870 to 1873, and from 1874 to 1880 was pastor of the Congregational Church at Lenox, Mass. In 1880 he became pastor of the Madison Square Presbyterian Church, New York City, where for twenty-five years he has held a leading position among New York clergymen. In 1885 he commenced his work as a social reformer and became president of the Society for Prevention of Crime. His personal study of crime in New York led to the famous Lexow Investigation of the charge that the police were in league with metropolitan criminals. He entered into active participation in local politics and was one of the factors which defeated Tammany Hall in 1894. The following year he organized the City Vigilance League of which he has been president. In Presbyterian theology Dr. Parkhurst has been an advocate of revising the confession of faith and was a leading champion of Dr. Briggs at his trial for heresy. His books include: *The Blind Man's Creed* (1883); *The Pattern on the Mount* (1885); *Three Gates on a Side* (1891); *What Would the World Be without Religion?* (1894); *The Swiss Guide* (1894); *Our Fight with Tammany* (1895); *The Sunny Side of Christianity* (1896); *Talks to Young Men* (1897); *Talks to Young Women* (1897); and *Guarding the Cross with Krupp Guns* (1900). W.M.C.



DR. C. H. PARKHURST.

PARKMAN, FRANCIS, an American historian; born Sept. 16, 1823, in Boston, Massachusetts. He entered Harvard University in his seventeenth year, and before graduating in 1844, conceived the idea of writing a history of the French and Indian War. This scheme, despite delicate health and a serious affection of the eyes, he lived to work out, though it embraced much more than a brilliant narrative of that struggle. It included, also, a series of vivid pictures of the early Jesuit missions in North America, sketches of the pioneers of France in the New World, and of the founding of the ill-fated French colony on the St. Lawrence, and a graphic portrayal of the incidents of Mr. Parkman's own sojourn among trans-Missouri Indians before the advent of railways. After leaving Harvard, Parkman read law for two years, then sought recreation in the far West among the Indians, whom he described with much minute and interesting detail in *The Oregon Trail* (1847); after which he produced, in 1851, *The Conspiracy of Pontiac*, the first in publication, but the last in chronological matter of the series of narratives dealing with the long struggle for mastery on this continent. In 1865 appeared *The Pioneers of France in the New World*, in 1867 *The Jesuits in North America*, and in 1869 *La Salle and the Discovery of the Great West. The Old Régime in Canada* was published in 1874, *Count Frontenac and New France under Louis XIV* in 1877, and, leaping over, for the time being, the intervening history embraced in the two volumes entitled *A Half-Century of Conflict* (1892), there appeared *Montcalm and Wolfe* (2 vols., 1884), the culminating work of the series reciting the momentous events in the deadly struggle between France and England for dominion in the New World. He died in Jamaica Plain, near Boston, Nov. 11, 1893.

FRANCIS PARKMAN.

PARKS, NATIONAL, a term used in the United States to designate territory which has been reserved by act of Congress and exempted from sale by reason of picturesque natural features. Four tracts of land have thus been appropriated

—the Yellowstone region in Wyoming, the Yosemite Valley, the Sequoia or Big Tree Grove, and General Grant Park in California. (For a full description of the first named, see YELLOWSTONE NATIONAL PARK, in these Supplements. For a description of the features and scenery of YOSEMITE PARK, see CALIFORNIA, Vol. IV, pp. 618, 619.) The lands embraced within this latter park were granted by the government to the state of California in 1864, to be "held for public use, resort and recreation." In 1890 a bill was passed in Congress, creating a national park about this territory which the state was holding in trust. Its area is about 40 miles square; it is under the administration of the Secretary of the Interior, and a detachment of U. S. troops is maintained there for patrol duty, to ward off stock-raisers and other trespassers, and to guard against fires.

The SEQUOIA and GENERAL GRANT parks, situated to the south and west of the Yosemite, are tracts of much smaller extent, and were created national parks in 1891, for the purpose of preserving the magnificent growths of *Sequoia*, or redwood trees. They also are patrolled by U. S. troops, under the direction of the Interior Department.

PARKS, NATIONAL MILITARY.— *Gettysburg.* Much work had already been done to preserve this historic battlefield by the Gettysburg Battlefield Memorial Association, but upon the passage of the bill, passed by Congress in 1895, the entire work passed into the hands of the government. It directed the Secretary of War to receive from the Memorial Association deeds of the various tracts, embracing about 800 acres. The work was in charge of commissioners, to lay out roads, and mark out the several lines of battle for all the troops engaged. The bill also provided that adjacent lands occupied by the several divisions on July 1, 2, and 3, 1863, should be acquired by condemnation or purchase. The bill appropriated $75,000 for purposes of improvement, and $5,000 for a bronze tablet, upon which was inscribed the historic address of President Lincoln, Nov. 19, 1863, on the occasion of the dedication of the national cemetery at that place. The various states whose troops were in this engagement, aided by contributions from veterans' associations and other sources, placed numerous fine monuments about the field.

Chickamauga and *Chattanooga.* This park embraces the entire battlefield of Chickamauga and its approaches, inscribing an area of about 15 square miles. The government also acquired title, among other purchases, to Bragg's headquarters on Missionary Ridge, and to Orchard Knob, the headquarters of Grant, Thomas and Granger. The approaches round about Chickamauga, over which the armies reached and left the field, as well as the roads within the park, were substantially rebuilt by the government. The roads about Chattanooga follow the lines of battle. Over Lookout Mountain the route includes the battlefield of Hooker, and near Walthall's, while along Missionary Ridge the crest road follows Bragg's line of battle, in front of Thomas's and Sherman's divisions. The result is a magnificent boulevard, with such charms of bold mountain view, including city, valley and river, which together, with the historic associations, render this drive one with scarcely a parallel. The dedication ceremonies of this national military park were held on Sept. 18–20, 1895, the 32d anniversary of the battle of Chickamauga, and were presided over by Vice-President Stevenson. Federal and Confederate generals were present, besides governors, Representatives and Senators from many states.

Shiloh. In 1895 Congress passed a bill which provided for the establishment of a similar park at the field of Shiloh, in Tennessee, embracing an area of about 3,000 acres, together with an appropriation of $150,000 to carry out the work.

PARKS, NATURAL, OF THE ROCKY MOUNTAINS. These parks constitute one of the interesting features of the state of Colorado. (For a brief and partial description of them, see COLORADO, Vol. VI, pp. 145–147.) The four principal ones within this state bear the names of North Park, Middle Park, Estes Park and South Park. They are not small areas of ground, but great territories, which contain fields and forests, with great stretches of plains on which have roamed immense herds of buffalo or cattle.

North Park, situated in the extreme northern part of the state, covers a part of Routt and Larimer counties. It embraces an area of about 2,500 square miles, and is traversed by the North Fork of the Platte River. It is about sixty miles long and forty miles wide, with an altitude of 9,000 feet above ocean-level. The ranges of the Rockies which environ it rise nearly 5,000 feet higher. The park is, in its general features, an irregular plateau or basin, having a surface with gently rolling hills, and long level bottoms, and valleys clothed with luxuriant grasses and flowers. The hills are covered with timber.

Middle Park, located in Grand County, embraces an area of about 3,000 square miles, and has an altitude of 9,000 feet. Like North Park, it is environed by mountains. Its streams are tributary to Grand River. It contains Grand Lake, on the shore of which is the town of Grand Lake, the county seat of Grand County. About ten miles from Grand Lake is Hot Sulphur Springs, recognized as an attractive spot for invalids and other visitors. The springs are six in number, the waters from which unite in a common stream and flow over rocks into a natural basin. The resorts of Middle Park are fast growing in popularity.

Estes Park is located at the foot of Long Peak, about sixty miles from Denver, and is one of the most beautiful resorts of Colorado. It is about six miles long and four miles wide, with an average height of 7,000 feet. The general contour is much like that of its sister parks, abounding in gentle slopes, dark pines and beautiful winding trails leading from open glades of the valley up dark cañons. Its clear brooks unite to form a considerable stream named Big Thompson's Creek. The road to the park is difficult of ascent,

but is largely traveled by tourists because of the numerous attractions by the way, and by the still greater attraction to be found in the park itself.

South Park, the chief of the park system of Colorado, lies to the south and east of Middle Park, and is isolated from it by a great snowy mountain range. It is fifty miles in length and about ten miles in breadth. Its northern extremity begins about seventy-five miles southwest from Denver, and is reached by the Denver and South Park railway. The maximum elevation is about 10,000 feet and the average elevation about 9,000 feet. Its streams are the tributaries of the South Platte River. Its soil is unexcelled in richness, with easy facilities for irrigation, and the numerous grassy plains are readily converted into luxuriant fields of grain. The park is bounded on the east by a heavily timbered range 2,000 feet above the valley, while to the west are the snowy summits of "the Rockies." The South Park Mineral Springs, and Hartzell's Hot Sulphur Springs are in the southern portion of the park, and give promise of becoming points of great interest to invalids.

San Luis Park, Colorado, lying south of South Park, embraces an area of about 9,400 square miles, or about three times the area of Yellowstone Park. The beautiful San Luis Lake is a principal object of interest, and there are numerous thermal springs possessing medical properties. This park has nowhere an altitude of more than 7,000 feet, and the climate is exceedingly mild and genial.

PARKVILLE, a city of Platte County, northwestern Missouri, 10 miles N.W. of Kansas City, on the Missouri River, 22 miles below Leavenworth, Kansas, and on the Kansas City, St. Joseph and Council Bluffs railroad. It is in a district containing coal, building-stone and brick-clay, and yielding corn, small grains, dairy products, hemp and wool. The city has saw-mills, brickyards and machine-shops. It is the seat of Park College (Presbyterian), a co-educational institution established in 1875, and which, in 1902, had 21 instructors, 355 students and a library of 12,000 volumes. Population 1890, 769; 1900, 931.

PARLEMENT, the name applied, in France, down to the Revolution, to certain superior and final courts of judicature, in which, also, the edicts of the king were registered before they became laws. Of these the chief was that of Paris, but there were no fewer than twelve provincial parlements. These, though not actually connected with that of Paris, invariably made common cause with it in its struggles with the royal power. The Parlement of Paris dated from the fourteenth century. Its influence grew during the sixteenth century, and it began to find courage to deliberate on the royal edicts, as well as merely register them, which the King could always force them to do by coming in person and holding a *lit de justice*. Louis XV exiled the members from Paris in 1753 for their interference in the struggle between the Jansenists and the Jesuits, and in 1770 abolished the old Parlement altogether and established the Parlement Maupeou. Louis XVI, however, recalled the former councillors.

PARLEY, Peter See Goodrich, Samuel G., Vol. X, p. 689.

PARLIAMENTARY LAW, the name of that body of rules or usages commonly observed in deliberative assemblies. These usages are sufficiently understood to be put in practice whenever men gather together for conference and the expression of a common judgment. In the main, they followed the principles or order observed by legislative bodies, and hence the name "parliamentary law."

All deliberative bodies that have continued existence adopt their own rules of proceeding, and these supersede any other methods of doing business. Yet there is a substantial accord in all adopted systems of deliberative order, for they all rest upon precedents found to be fair and convenient. Thus a lodge, the political conventions of a party, each state legislature and Congress have each its own body of rules (see Congress, in these Supplements), and yet through them all may be traced the same general usage.

The following statements exhibit the rules that will be observed in transacting the business of any assembly which has not adopted rules of its own. They are:

Organization. When a number of persons has been called together for conference, on their meeting some individual prominently responsible for the summons, will call the assembly to order and ask for the nomination of a presiding officer or chairman. If several names are proposed, and the proposal seconded, the wish of the meeting is taken, in the order of making the nominations, until a majority of voices are given for one person. This person goes forward and takes the chair, and upon him devolves the enforcement of the rules of order. Usually he does not vote on any matter pending before the assembly, though he may ask to be counted with the others in voting, and his right must be respected. He has no tie vote, for a motion is lost that does not have a majority of voices or votes in its favor. The chairman first asks the meeting to choose a secretary, and he is selected in the same manner as the chairman.

With the selection of a secretary the essential organization is complete. It is the duty of the secretary to keep a record of all proceedings, to see that all resolutions are reduced to writing, if so requested, and to read all resolutions, papers or communications for the information of the meeting, as directed by the chairman.

After the chairman has declared the assembly open for business, motions are in order. A *motion* is a formally worded proposition presented to the assembly for its consideration. The member offering it says: "I move," etc. The resolution which he offers commences: "Resolved," etc. The questions are decided by vote. A majority vote decides the question.

In putting a question the chairman says: "The question is on the adoption of the motion (or

resolution, or amendment) which you have just heard. As many of you as are in favor of its adoption will say Aye." When the ayes have voted he will say: "As many as are opposed will say No." After voting is over, the chairman announces the result. Since he has to judge from the number of voices heard, the vote by voice is only approximate. Holding up the hands and counting the uplifted ones is more reliable. When the chair is in doubt as to his estimate of a vote by voice, he asks the members to rise and stand still until counted. This count decides how many votes there are for and how many against the question. If a member doubts the correctness of the chairman's estimate or a vote by voice he will rise and say: "Mr. President, I call for a division of the house." Upon this the chairman says: "A division is called for. Those in favor of the motion will rise and stand until counted." In a similar way he will take the opposing votes. In taking a division of the house, the standing members may be counted by the chairman, or the clerk, or by one or more members appointed by the chair.

Another method of dividing the house, common in the British House of Commons and in Congress, is to have those favoring a proposition pass between two tellers and be counted, and then in the same way take the negative vote.

Again, in representative bodies, a vote may be taken by making each member answer when his name is called and having his vote recorded. In Congress this mode of voting must be resorted to when the demand for it is sustained by one fifth of the members present. Voting by ballot is usually required in the election of officers, in the admission of new members, and also when secrecy is desired. In the admission of members, white and black balls, or slips of paper, are often employed.

Motions, and their Treatment. After a motion has been presented, other motions bearing upon the same subject are in order. The first motion is then called the "main" question, the subsequent ones are subsidiary or secondary. The most common of the subsidiary motions is that to amend the main one. The mover offers an amendment. Then others may move to amend the amendment, but no further amendment can be offered until the second one is disposed of. The vote on the amendment to the amendment must first be taken. If adopted, the question arises on allowing the amended amendment to modify the main question. If this prevails, then a vote must be taken on adopting the main question as amended. If all amendments are rejected, a vote is taken on the resolution as originally offered.

If a motion to *postpone to a certain day* is moved and carried, when the day has come the subject is entitled to be taken up in preference to everything else except privileged questions. If a motion to *postpone indefinitely* is made and carried, the question is killed, and to bring the subject up again would require new proceedings from the beginning, at some later time.

A motion to *refer* or *commit*, if adopted, takes the question from the meeting and transfers it to the consideration of a committee. A motion to *recommit* takes a subject already reported by a committee back to the same committee. All the above-mentioned motions are debatable.

A motion to *lay on the table* is not debatable. If adopted, it removes the question from consideration until the assembly votes to take it up. This can be done at any time by a majority vote. The motion to lay on the table carries the main question and all amendments with it.

The *previous question* is a method of cutting off debate. It is undebatable. It is equivalent to the question, Shall the discussion now cease? A member rises and says: "I move the previous question." Then the chairman puts the question before the house by saying: "Shall the main question be now put?" If the previous question is carried, the debate on a pending amendment, or both amendment and the main question, is stopped.

Incidental Questions. There is a class of questions which are called incidental. These include,— 1. Questions of order; 2. Objections to the consideration of a question; 3. Reading of papers; 4. Withdrawal of a motion; and 5. Suspension of the rules.

If anything in the procedure is against parliamentary law or the rules of the house, and a member, rising, addresses the house thus: "I rise to a point of order," the chairman will interrupt the proceedings and say: "The member will state his point of order." The member then will state his point, and the chairman thereupon will decide whether the point is, or is not, well taken. If, now, any member is dissatisfied with the decision of the chair, he takes "an appeal to the house." The question then is: "Shall the decision of the chair stand as the judgment of the assembly?" An appeal to the house is debatable, except when the previous question was pending at the time when the point of order was raised. To sustain the chair does not require more than a majority vote. Even a tie vote sustains his decision.

Privileged Questions. Some questions may be introduced at almost any time, and must be considered before any other subject that may be before the house. These privileged questions are: 1. To adjourn; 2. To fix the date to which the body shall adjourn; 3. Questions of privilege; 4. A call for the order of the day.

A motion to adjourn is nearly always in order. The exceptions are these: If a motion to adjourn has just been lost, it cannot be repeated until there has been some business done or some progress in the debate made since the motion had been lost. Neither can the motion to adjourn be made while a member has the floor. But the member may give way in order that the motion may be presented. A motion to adjourn cannot be received while the yeas and nays are being called, or while the members are voting on any question, or when the previous question has

been called and sustained and is still pending. The motion to adjourn cannot be debated or amended. It supersedes all other motions except the one to fix the date to which to adjourn. The motion to fix the time to which the adjournment will stand, when the meeting does adjourn, takes precedence of all other questions. It may be made after the meeting has voted to adjourn, as long as the chairman has not announced the result of the vote. It may be amended by changing the date of reassembling.

The general rule as to the rank of questions is that of the United States House of Representatives, which is as follows: "When a question is under debate no motion shall be received but to fix the day to which the house shall adjourn, to adjourn, to take a recess, to lay on the table, for the previous question . . . to postpone to a certain day, to refer or amend, or to postpone indefinitely, which several motions shall have precedence in the foregoing order."

A motion to *reconsider*, if carried, brings back before the house a question that has been decided, and places it again before the house just as it stood before the vote was taken upon it; but, as the rule of the United States House of Representatives puts it, "the fact of a question having been decided under the operation of the previous question does not prevent debate on the motion to reconsider if the original question was otherwise debatable." The motion to reconsider may be applied to votes on all questions excepting on motions to adjourn, to suspend the rules, affirmative votes on motions to lay on the table or take from the table, on matters which have passed from the possession of the house, and on the previous question when it has been partly executed. It may be made when other business is before the house.

Duties of the Chairman. The chairman must recognize the member who rises first and addresses him first. No member can be deprived of his rights by the chair, as long as he is in order. But there is this exception: When the member, upon whose motion the subject on hand has been brought before the house, has not spoken on the question and asks to be heard, the chairman is bound to give him the first chance to speak. During the debate the chairman has no right to cut it off before all the members who have asked for the floor have had their chances. When a vote has been taken and the result announced, if it appears that a member had risen and addressed the chair at the proper time, but was not recognized, even then his right to speak must be conceded, and the question voted upon will stand as though no vote had been taken.

Most legislatures have rules of order substantially like those of the House of Representatives in Congress. Two excellent manuals of parliamentary law are *Roberts's Rules of Order* (1893) and *Reed's Parliamentary Rules* (1894). See also PARLIAMENTARY PROCEDURE, Vol. XVIII, p. 317.

PARMA, ALEXANDER FARNESE. See FARNESE, Vol. IX, pp. 34, 35.

PARMA, DUKES OF. See PARMA, Vol. XVIII. p. 319.

PARNAHYBA OR PARANAHYBA RIVER. See BRAZIL, Vol. IV, p. 199. For the town, see PARNAHYBA, Vol. XVIII, p. 262.

PARNASSIENS, a group of French poets of the second empire, so designated from the title of the volume *Parnasse Contemporain*, which comprised their first poems, collected in 1866. These poems are characterized by a cultivation of metrical form before all else, and the rejection of emotion as a poetic stimulus in favor of that which is spectacular or which appeals to the senses.

PARNELL, CHARLES STEWART, reformer; born in Avondale, Ireland, in June, 1846; was educated at Cambridge University. In 1874 he was elected to succeed his father as high sheriff of Meath, and in 1875 was a successful candidate for the House of Commons, where very little attention was paid to him at first except that he was recognized as a follower of Mr. Butt, the exponent of Home Rule for Ireland. During the first session of the House he carefully studied everything that was said and done. In the second session he began to comment on matters of small importance. Thus he trained himself and finally drifted to the topics uppermost in his mind, Home Rule in Ireland. At first he was treated with contempt, then jeered and hooted at; but he was determined to be heard. Finally his opponents, seeing they could not subdue him by noise, allowed him to speak. After the death of Mr. Butt he became the leader of the Irish party in the House of Commons. When he was chosen leader of his party, it was composed of only four members, but at the end of seven years it had increased to eighty. In 1879 he visited the United States and was listened to by great throngs. The result of this visit was the organization of many branches of the Irish Land League, and a great amount of money was raised to forward the cause. In 1881 Gladstone introduced his Coercion Bill against Ireland, which, after a stormy scene, was passed. In 1885, when, under Parnell, eighty members were elected to Parliament, Gladstone changed his views, and on April 8, 1886, introduced the celebrated bill under which Ireland was to have a government of its own. This bill was defeated by a margin of only thirty votes. At this juncture Parliament was dissolved and an appeal taken to the country. The result of the election, as shown when Parliament assembled, was 277 members for Home Rule, and 392 against it. Mr. Gladstone and Parnell were now firm friends. The cause of the latter was gaining steadily, but all his work of years

CHARLES STEWART PARNELL.

was defeated, when Captain O'Shea secured a divorce from his wife whom he accused of undue intimacy with the Irish leader, to whom Mrs. O'Shea was afterward married. After this the cause of Home Rule rapidly declined, Parnell becoming very bitter toward his former friend and benefactor, Mr. Gladstone. Mr. Parnell died in Brighton, England, October 6, 1891. G.J.H.

PARNELL, HENRY BROOK. See CONGLETON, Vol. VI, p. 235.

PARNELL INQUIRY. See HOME RULE, in these Supplements.

PARNELLITES AND ANTI-PARNELLITES. See HOME RULE, in these Supplements.

PAROL, a term used in American law to describe verbal contracts, and written contracts not under seal. All contracts, whether in writing or verbal, are called parol contracts unless they are under seal. Sealed instruments are generally called specialties. Under the old common law the pleadings in a suit were sometimes referred to as the parol. Parol evidence is that which is given in open court verbally.

PAROLE, the declaration made by a person in which there is no more than his sense of honor to restrain him from breaking his word Thus a prisoner of war may be released from actual prison on his parole that he will not go beyond certain designated limits, or he may even be allowed to return to his own country on his parole not to fight again, during the existing war, against his captors. To break parole is accounted infamous in all civilized nations, and an officer or soldier who has done so forfeits any claim to be treated as an honorable man, nor can he expect quarter should he again fall into the hands of the enemy.

PAROPAMISAN MOUNTAINS. See ASIA, Vol. II, p. 599.

PAROTID GLAND. See DIGESTIVE ORGANS, Vol. VII, p. 193.

PAROWAN, a city and the capital of Iron Co., Utah, about 220 miles S.S.W. of Salt Lake City, on Center Creek. It is situated in an agricultural region said to contain coal, iron and silver. The city has tanneries, saw-mills and a flour-mill. Pop. precinct, 1900, 1,039.

PARR, KATHARINE, a tutor to Queen Elizabeth and last wife of Henry VIII. See ENGLAND, Vol. VIII, p. 302; also CATHERINE PARR, Vol. XXVI, p. 87.

PARR, THOMAS, a centenarian. See LONGEVITY, Vol. XIV, p. 869.

PARRAKEET, PARAKEET OR PARROQUET. See PARROT, Vol. XVIII, p. 327.

PARRIDÆ. See JACANA, Vol. XIII, p. 541.

PARROTT, ROBERT PARKER, an American inventor; born in Lee, N. H., Oct. 5, 1804. He was graduated from the United States Military Academy in 1824, and until 1830 was instructor in natural science in that institution. In 1836 he served in the war against the Creeks, with the rank of captain, and in the same year became a member of the United States Ordnance Bureau in Washington. He resigned his commission and while superintendent of a cannon foundry at Cold Spring, N. Y., invented the well known Parrott gun, or rifle cannon, which came into prominence during the Civil War. He severed his connection with the Cold Spring foundry in 1867 and became engaged in various business enterprises in New York City. He died in Cold Spring, N. Y., Dec. 24, 1877. W.M.C.

PARRY, CHARLES CHRISTOPHER, botanist; born in Worcestershire, England, Aug. 28, 1823; came to the United States in 1832; was educated at Union College, and practiced medicine in Davenport, Ia. While thus engaged his botanical studies in the surrounding district gave him reputation as an able botanist, and in 1848 he was appointed botanist on the Geological Survey of the Northwest, and afterward on that of the Mexican boundary. Subsequently he was botanist to the Pacific Railroad Survey of the 35th parallel, and from 1867 to 1871 did botanical work for the Department of Agriculture. He made extensive collections in the West and many new species were discovered by him, a number of them bearing his name in their specific title. He was the author of *Botanical Observations in Western Wyoming* (1874); *Botanical Observations in Southern Utah* (1875); *Revision of the U. S. Pacific Coast Species of Arctostaphylos* (1883); *The North American Genus Ceanothus* (1888), etc. He died at Davenport, Ia., Feb. 20, 1890. G.J.H.

PARRY, SIR CHARLES HUBERT HASTINGS, musician; born in Bournemouth, England, Feb. 27, 1848; was educated at Oxford University, and then applied himself to the study of music. He achieved distinction in this profession, and in 1899 was chosen professor of music at the University of Oxford. Subsequently he became chorus leader of the university, and director of the Royal College of Music. He was also elected honorary fellow of Exeter College, Oxford. His compositions include *Music to the Birds of Aristophanes; Music to the Frogs of Aristophanes; Judith; Ode for St. Cecilia's Day; The Lotus Eaters; L'Allegro and Penseroso; Blest Pair of Sirens; Invocation to Music; De Profundis; Job; King Saul; Magnificat; Song of Darkness and Light*, etc. He was also the author of *Studies of Great Composers; Evolution of the Art of Music*, and numerous articles in *Grove's Dictionary of Music* and *Summary of Musical History*. G.J.H.

PARRY, JOSEPH, a British musical composer; born in Merthyr-Tydfil, Wales, May 21, 1841. In 1854 he went to the United States with his parents, but in a few years returned and received instruction in music, for which he had real talent. In 1862 he won prizes at the Llandudno Eisteddfod, and in 1863 at the Swansea Eisteddfod. In 1868 he entered the Royal Academy of Music, and studied under Sterndale, Garcia and Steggall. He was appointed professor of music at the University College, Aberystwith, and soon after took his Mus Bac. degree at Cambridge, and in 1878 that of Mus.Doc. at the same university. Among his compositions are *Blodwen*,

an opera performed in 1878, and *Emmanuel*, an oratorio performed in 1880. Died Feb. 17, 1903.

PARRY SOUND, a town and the capital of Muskoka and Parry Sound District, northwestern Ontario, Canada, 50 miles N. of Midland, on Parry Sound, an eastern arm of Georgian Bay; at the western terminus of the Canadian Atlantic railroad and having steamboat connection with lake ports. The town is the center of a district devoted almost exclusively to the lumber industry; has large sawmills in the vicinity, and is an important shipping-point for their product. Population 1901 (estimated), 2,884; with McDougall and Parry Island, 3,337.

PARSEES. See Parsis, Vol. XVIII, pp. 330–333.

PARSLEY. See Horticulture, Vol. XII, p. 302; and Umbelliferæ, in these Supplements.

PARSNIP. See Horticulture, Vol. XII, p. 297; and Agriculture, Vol. I, p. 328.

PARSON-BIRD. See Honey-Eater, Vol. XII, p. 143.

PARSONS, a city of Labette County, southeastern Kansas, about 35 miles S. of Humboldt and about 12 miles N.W. of Oswego. It is an important railroad center, being located upon the Kansas City, Fort Scott and Memphis and on several branches of the Missouri, Kansas and Texas railroads; is a trading and shipping point for a farming and grazing district; contains machine-shops of the Missouri, Kansas and Texas railroad, giving employment to a large number of hands, and manufactories of plows, furniture, pottery and tiles; has banks, several churches, a public library, good school system, two daily and six weekly newspapers. Population 1890, 6,736; 1900, 7,682.

PARSONS, a post borough of Luzerne County, eastern Pennsylvania, 2 miles E. of Wilkesbarre, on the Delaware and Hudson railroad and the Central Railroad of New Jersey. It is in a region devoted almost exclusively to coal-mining, and has several collieries. Population 1900, 2,529.

PARSONS, Samuel Holden, an American soldier; born in Lyme, Conn., May 14, 1737. He was graduated from Harvard, and was admitted to the bar in 1759. He was a member of the Connecticut State Assembly for many years, and at the outbreak of the Revolution was appointed colonel of the Sixth Connecticut regiment. In August, 1776, he was made a brigadier-general. After the evacuation of Boston by the British he was transferred to New York, where he participated in the battles of Long Island and White Plains. In 1777 he was promoted major-general and succeeded to the command of Gen. Putnam. In 1785 President Washington appointed him a commissioner to negotiate with the Western Indians, and in October, 1787, he was appointed one of the judges of the Northwest Territory. He was accidentally drowned near Marietta, Ohio, Nov. 17, 1789. W.M.C.

PARSONS, Theophilus, an American jurist; born in Byfield, Mass., Feb. 24, 1750. He graduated at Harvard in 1769, and practised law in Falmouth (now Portland), Me., and in Byfield, and later established himself at Newburyport, Mass. In 1778 he became a member of the Essex Junto, and in 1788 he was influential in the ratification of the Federal Constitution, and was the author of the so-called "conciliatory resolutions." He occasionally served in the legislature, but took no prominent part in public affairs. In 1800 he removed to Boston, and in 1806 was appointed chief justice of the Supreme Judicial Court, a position he held till his death in Boston, Oct. 30, 1813. E.E.T.

PARSONS, Thomas William, an American poet; born in Boston, Aug. 18, 1819. His father was a physician, and intended his son for that profession. He was educated at the Boston Latin School, and graduated in medicine at the Harvard Medical School. For some time he practised dentistry, but he travelled much and resided much abroad, especially in Italy. In 1843 he published a translation of the first ten cantos of the *Inferno*, and in 1867 a revision with seven more cantos. The complete epic appeared in 1893, his version having been made a life labor. Many of his volumes of verse were printed privately for circulation among friends, as he was never eager for publication. Several collections of his poems were published, including *Ghetto di Roma* (1854); *The Magnolia* (1867); *The Shadow of the Obelisk* (1872); *Circum Præcorda* (1892); and a final selection in 1893, after his death, which took place in Scituate, Mass., Sept. 3, 1892. E.E.T.

PARTHENOGENESIS, in botany, is applied to cases in which the oösphere (female gamete) germinates without fertilization, as though it were an oöspore. Notable examples are to be found among the *Saprolegniæ*, a fungus group of water-molds. The so-called cases of parthenogenesis among seed-plants do not belong in this category.

PARTHENOGENESIS, a mode of reproduction in which ova develop without being fertilized. This phenomenon is common among certain lower crustacea, certain insects and some plants. In the common bee the eggs last deposited develop, without fertilization, into drones. In some flies the ova develop parthenogenetically while still in the larval stage, a condition known as pædogenesis. In the pyllopods and other entomostracan crustaceans, males seem to appear only on the beginning of unfavorable conditions, such as the approach of winter. At such times eggs are laid and fertilized. These lie dormant until the return of favorable conditions, when they develop into individuals, which reproduce parthenogenetically. Parthenogenetic generations then succeed one another until unfavorable conditions return. No satisfactory explanation has yet been advanced. Weismann held that there was some connection between parthenogenesis and the number of polar bodies separated from the egg, since in certain parthenogenetic eggs but one polar body is formed, while two are usually formed in all eggs requiring fertilization. However, this explanation is not satisfactory, for in some cases two polar bodies are formed and the egg develops parthenogenetically. See Hymenoptera, Vol. XII, p. 609; Insects, Vol. XIII, p. 153; Reproduction, Vol.

XX, p. 440; and EMBRYOLOGY, in these Supplements.

PARTHENON. See ATHENS, Vol. III, pp. 6, 7. Sculptures of. See ARCHÆOLOGY, Vol. II, p. 311; also ARCHITECTURE, Vol. II, opp. p. 353.

PARTHIAN, EMPIRE. See PERSIA, Vol. XVIII, pp. 597–617.

PARTICK, a town of Lanarkshire, southwestern Scotland, prettily situated, chiefly on a rising ground on the Kelvin, immediately above its junction with the Clyde, and 3 miles N.W. of the Cross of Glasgow, of which city it now forms a suburb. Nine tenths of the workmen of Partick are engaged in shipbuilding-yards, but there are also many flour-mills, cotton factories and bleach-fields. Many of the inhabitants carry on business in Glasgow and have handsome homes in Partick. Population 1901, 54,274.

PARTNERSHIP. Every association of two or more persons for the purpose of doing business on joint or undivided account is a partnership. As a rule, the term is only applied to unincorporated business associations. A partnership may be constituted either by the respective persons contributing capital or skill, or one or more furnishing capital and others skill.

The general principles of law governing contracts are to be extended to the relation of persons in partnership with each other. Persons entering into partnership must not be incapacitated to enter into this contract; that is, they must not be minors, or imbeciles, or under duress, etc. The capital of a mercantile partnership usually consists of personal property, though there may also be real estate, and for the purposes of the partnership. The question may arise whether this land is to be governed by the technical rules applying to real estate, or by those which prevail in the law of personal property. If a partner dies, his widow can have no dower in this land, nor can his heirs inherit, until all the partnership debts are paid and the joint affairs are fully settled. After this the widow can have her dower and the heirs can inherit.

The "good-will" of a partnership is often an important part of its assets. This is the expectation that customers will continue to resort to the place where the business is transacted. The good-will is property of a peculiar kind. It cannot be sold by a sheriff on an execution, as it is in its nature intangible. When one of the partners dies, his executor can only realize something from this source by selling the stock and premises together. In this case the good-will goes naturally with the sale of the premises.

Partners are classified into secret, dormant, nominal and ostensible. A "dormant" partner is one who supplies capital but takes no active part in the management. A "secret" partner is one who is not known as a partner, though he may be active in the interest of the concern. A "nominal" or "quasi" partner is one who has no real connection with the firm, but holds himself out as a partner. Persons who give credit to the firm on the faith of his name may hold him liable on the ground of estoppel.

In some of the states there is a partnership known as limited. In a "limited" partnership no liability is incurred by the members beyond the amount of their subscription. It is in the nature of a corporation. "Joint-stock companies" are partnerships consisting of a large number of persons whose liability is usually that of a general partner. Holding land in partnership by speculators is recognized as true partnership, but farming land on shares has been held to be no partnership.

One who merely lends his name to a firm (nominal partner) is liable to those who have acted upon the supposition that he was in fact a partner. He may directly assert his partnership, or he may give the firm permission to use his name over the shop-door or in printed notices, bills, advertisements, etc.: in all cases he will be estopped from denying his liability as a partner, even if he has no share whatever in the firm. It is essential, however, that this holding himself out as a partner should have been prior to the contract with the third person, as well as the inducement to it.

A point of interest in partnership law is the capacity of one member of a firm to bind his associates in respect to third persons. The partnership liability rests upon the participation in the profits; because, whenever a person takes by agreement a share of the profits of a firm, he withdraws a portion of the funds to which the creditors of the firm had a right to look for reimbursement. He should accordingly be held liable to the creditors. This is the doctrine laid down in a celebrated early English case, *Waugh vs. Carver*, which has been quite generally followed in the courts of the United States. The New York court of appeals has reaffirmed, in the case of *Leggett vs. Hyde*, the correctness of this theory, and makes the participation of profits the basis of partnership.

If a partner gives a promissory note and signs the firm-name without the consent of his associates, and this note is taken up before maturity in the regular course of business by a purchaser in good faith, the latter can collect the note from the firm, notwithstanding the partner who has executed the note has no right whatever to bind the firm by such a note. The ground of this rule is, that the partner issuing the note had the "apparent authority" to issue it, and that a third party could not possibly distinguish this note from others which the partner has a real right to issue. If, however, the purchaser of the note knew, or had reasons to know, that the partner was violating his duty, the firm will not be liable for the note.

Owing to the intimate relations between partners, the act of one is for many purposes the act of all. Notice to one of any fact touching their common business is notice to all. An admission made by one is supposed to be made by all. Such an admission, if it affects their common interests, is receivable in evidence. If one of the partners commits a wrongful act (tort), or commits a fraud, in connection with the common business, all of them are answerable for it. The liability ceases when the wrongful act is wholly unconnected with the partnership business.

The relation of partners between themselves is

largely based on trust and confidence. This view prevents each one from doing any act without the partners' consent in reference to the firm business, which shall inure to his own advantage. Thus, if he buys up a claim against the firm for less than its face value, he can only charge to the firm what he actually paid. If he take from a landlord, in his own name, a renewal of a valuable lease belonging to the firm, he will be obliged to account as a trustee for the profits which may accrue.

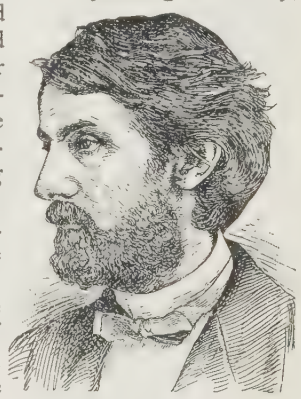
DISSOLUTION OF PARTNERSHIP. A partnership may be dissolved in a number of ways. The leading modes are:

(*a*) The express consent of the parties.
(*b*) The sale by one of his interest.
(*c*) Death of one or more members.
(*d*) Bankruptcy.
(*e*) Marriage of a female partner.
(*f*) Insanity legally established.
(*g*) The fact that one becomes by the law of nations an enemy of his associates.
(*h*) The action of a court of equity decreeing a dissolution on such grounds as, that the ends sought to be accomplished are impracticable; or, that one of the firm is so conducting himself as to bring disaster upon the common interests; or, is in such a state of mind that he cannot contribute to the common advantage, etc.
(*i*) The voluntary withdrawal of a member.

The effect of the dissolution is to prevent any new contracts from being made. It only remains to pay outstanding debts and to close existing transactions. Actual notice of dissolution must be brought home to persons who have been in the habit of dealing with the firm; with regard to persons who have had no previous dealings with the firm, notice in the newspapers is sufficient. This notice is necessary to terminate the agency of each partner and his powers and liabilities as such. When the dissolution takes place by operation of law or by the death of a partner, notice is not necessary. See also PARTNERSHIP, Vol. XVIII, pp. 334–337.

PARTON, ARTHUR, an American landscape-painter; born in Hudson, New York, March 26, 1842; studied at the Pennsylvania Academy of Fine Arts in Philadelphia; went to Europe in 1870, and studied in Paris; removed to New York in 1865; associate of the Academy of Design in 1871 and academician in 1884. In 1886 he received a gold medal at the American Art Association for his *Evening after the Rain.* Among the more important of his works are *On the Road to Marcy*, owned by Charles Farwell of Chicago; *A Mountain Brook*, purchased by A. T. Stewart, New York; *November*, owned by Lord Moncke, ex-Governor-General of Canada; *Sycamores of Old Shokam* (1876), in Amherst College collection; *Delaware River, near Milford* (1879); *Winter on the Hudson* (1885); etc.—His brother, ERNEST, also a landscape-painter, was born in Hudson, New York, March 17, 1845; spent two winters in the studio of his brother, but received no instruction from regular masters. In 1873 he opened a studio in London, and frequently exhibited at the Royal Academy, the Academy of Design, New York, and elsewhere. He received a medal from the Boston Art Institute in 1883, and became a member of the Royal Institute of Painters, London, and the Artists' Fund Society, New York. Among his most important works are *Morning Mist* (1873); *Papa's Lunch* (1875); *The Placid Stream* (1876); *The Silent Pool, Reflections, Au Bord de l'Eau* and *On the River Loing* (1878); *Silver and Gold* (1882); *Where Memory Dwells* (1884); *Last of October* (1886); etc.

PARTON, JAMES, an American historian and biographer; born in Canterbury, Eng., Feb. 9, 1822. He was educated in New York city, and became a school teacher in 1845. He was assistant editor of the New York *Home Journal* for three years, being associated with N. P. Willis, whose sister, Sara Payson Willis Eldridge ("Fanny Fern"), he married in 1856. In 1855 he published his *Life of Horace Greeley*, of which over 30,000 copies were sold. This was followed in 1857 by his *Life of Aaron Burr*, which became very popular. He then devoted himself entirely to literature and wrote the *Life of Andrew Jackson* (1859); *Humorous Poetry of the English Language from Chaucer to Saxe* (1856); *General Butler in New Orleans* (1863); *Life and Times of Benjamin Franklin* (1864); *People's Book of Biography* (1868); *Famous Americans of Recent Times* (1870); *Triumphs of Enterprise, Ingenuity, and Public Spirit* (1871); *Topics of the Time* (1871); *Life of Thomas Jefferson* (1874); *Caricature in All Times and Lands* (1875). In 1875 he removed to Newburyport, Mass., where he made his permanent residence, living in more or less retirement. After this he wrote *Life of Voltaire* (1881); *Noted Women of Europe and America* (1883); *Captains of Industry* (1884). He died in Newburyport, Mass., Oct. 17, 1891. W.M.C.


JAMES PARTON.

PARTON, SARA PAYSON WILLIS ("Fanny Fern"), an American author, wife of James Parton; born in Portland, Me., July 9, 1811. She was educated in Boston and Hartford public schools and was married at an early age to Charles H. Eldridge of Boston. A few years later she was widowed, and left dependent upon her own resources. Turning her attention to literature she began writing under the pseudonym of "Fanny Fern." In 1856 she married James Parton, who was associated with her brother, N. P. Willis, in the editorial conduct of the New York *Home Journal.* Her first collection of stories and sketches *Fern Leaves* was published in 1853 and enjoyed wide popularity. She also wrote *Little Ferns* (1853); *Ruth Hall* (1854); *Fern Leaves*, 2nd Series (1854); *Rose Clark* (1857); *Fresh Leaves* (1857); *The Play Day Book* (1857);

A New Story Book for Children (1864); *Ginger Snaps* (1870); *Caper-Sauce* (1872). She died in Brooklyn, N. Y., October 10, 1872. Her husband published *Fanny Fern*, a memorial, the following year. W.M.C.

PARTRIDGE, a popular name applied to several widely different species of game-birds of the grouse family. The partridge of England is *Perdix cinerea*. The red-legged partridge of the continent is *Caccabis rubra*. The ruffed-grouse (*Bonasa umbellus*) of the northern United States is called partridge in some localities. In other localities, quail and other allied birds have the popular name applied to them. PARTRIDGE, Vol. XVIII, p. 337; and QUAIL, Vol. XX, p. 153.

PARTRIDGE, ALDEN, an American soldier; born in Norwich, Vt., about 1785. He was graduated at West Point in 1806, and was assistant professor and afterward professor of mathematics there from that time until 1813. He was professor of engineering from 1813 to 1816, and superintendent from January, 1815, to November, 1816, and from January to July, 1817. In 1818 he left the service with the rank of captain. He was the principal of the exploring survey sent out in 1819 to determine the northwest boundary of the United States. In 1820 he founded at Norwich, Vt., a military academy, which was afterward removed for a time to Middletown, Conn., but was later restored to Norwich and incorporated as Norwich University with Capt. Partridge as its president. He subsequently founded similar institutions in Pennsylvania, Virginia, and Mississippi; and was a member of the legislature from 1833 to 1839. He died in Norwich, Vt., Jan. 16, 1854. E.E.T.

PARTRIDGEBERRY, the common name of *mitchella repens*, a plant of the family *Rubiaceæ*. It is a small plant, common in forests, creeping over the ground, with small, round evergreen leaves, white or purplish-tinged fragrant flowers in pairs at the end of branches, and the two ovaries united to form a single persistent scarlet berry.

PARTURIENT FEVER. See VETERINARY SCIENCE, Vol. XXIV, p. 221.

PARTY-WALL. A party-wall is a wall erected on the boundary-line between two estates, and is owned by and subject to the joint use of the owners of the adjoining estates. The ownership is generally in common, but each party may own the wall to the center and have an easement or right to use the other half, or one party may own the wall and the other own a right to use it as a dividing-wall. Party-walls may become such by contract, prescription or statute.

PARVATI, a myth. See BRAHMANISM, Vol. IV, p. 187.

PARVIN, THEOPHILUS, an American physician; born in Buenos Ayres, Argentina, Jan. 9, 1829. He was educated at the University of Indiana, graduating in 1847. In 1864 he was appointed a professor in the Ohio Medical College and in 1869 was elected professor of obstetrics at the University of Kentucky. In 1872 he went to the Indiana Medical College and ten years later was a professor at the Jefferson Medical College in Philadelphia. He became prominent in his profession, was president of the American Gynecological Society, the American Academy of Medicine and the American Medical Association. He wrote various articles for the medical journals and reviews, and published *Science and Art of Obstetrics* (1866); and *Obstetric Nursing* (1889). He died in Philadelphia, Pa., Jan. 30, 1898. W.M.C.

PASADENA, a city of Los Angeles County, southern California, nine miles N.E. of Los Angeles, on the Los Angeles Terminal and the Southern California railroads, in the San Gabriel valley; is one of the most popular health-resorts of the Pacific coast. Since 1880 its growth has been phenomenal and its population has increased in a greater ratio than that of almost any other town in the state, while the improvements made upon its site are of an attractive and substantial character. It contains churches, schools, banking facilities, etc.; an opera-house and two commodious and well equipped public halls, five hotels, and other accommodations for the convenience of the visitors annually sojourning there to avail themselves of the benefits and health-giving properties of the climate. The raising of oranges and other fruits is the principal business interest of the vicinity, and large shipments of these productions are made yearly from Pasadena to the Eastern states and elsewhere. Some manufacturing is carried on in the city, including grist and planing mills, electric-appliance and barbed-wire factories, a fruit-canning establishment, and other enterprises. The city is lighted with gas and electric lights. Population 1890, 4,882; 1900, 9,117.

PASARGADE. See PERSEPOLIS, Vol. XVIII, p. 570.

PASCAGOULA, Mississippi, a river, bay and town of Jackson County; (1) the river formed by the union of the Chickasawbay and Leaf rivers in Greene County, flows into the bay on the Gulf of Mexico after a tortuous southerly course of 85 miles, 50 miles of which are navigable; (2) the bay at the mouth of the river is an inlet of the Mississippi Sound in the Gulf of Mexico, about 55 miles long and 8 miles broad; (3) the town at the mouth of the river has a good harbor and railway connections. Population, 1901, 708. C.L.S.

PASCO, SAMUEL, lawyer; born in London, England, June 28, 1834; removed to Prince Edward Island, and later to Massachusetts. He was graduated at Harvard University in 1858; and was principal of Waukeenah Academy. When the Civil War broke out he entered the Confederate army as a private, and served till the close. He then became clerk of the circuit court of Jefferson County, Fla., and in 1868 was admitted to the bar. In 1872 he was chosen a member of the State Democratic Convention; in 1876–88 was its chairman; in 1880–1900 was a member of the National Democratic Convention; in 1887 speaker

of the State Legislature; in 1887–99 a United States Senator, and in the latter year became a member of the Isthmian Canal Commission.

G.J.H.

PASCOAG, a village of Providence County, northern Rhode Island, 23 miles W.N.W. of Providence, on the New York and New England railroad. It is in a section having numerous manufacturing towns and machine-shops and many woolen-mills. Pop. 1890, 2,246 (not returned in census of 1900).

PASEWALK, a town of Pomerania, northeastern Prussia, 24 miles by rail W.N.W. of Stettin, on the Uker River. It was plundered and burned three times—by the Imperialists in the Thirty Years' War, by the Poles in 1657, and by the Russians in 1713. It is inclosed by a wall, and has manufactories of leather and woolen cloth. Population, 9,500.

PASHA, a Turkish title formerly bestowed upon princes, but now given to provincial governors, military leaders, and others. The distinctive badge of a pasha is one or more horsetails waving from a lance, three horsetails being the insignia of the pasha of the highest rank, who may also have the title of vizier. There are also pashas whose rank is indicated by two horsetails, and others by one.

R.W.C.

PASHT OR PAKHT. See EGYPT, Vol. VII, p. 622.

PASINI, ALBERTO, an Italian *genre* painter; born in Busseto, near Parma, Italy, in 1820; chevalier of the Order of Saints Maurice and Lazarus, and of the Legion of Honor; officer of the Orders of Turkey and Persia. He was a pupil of Ciceri, Isabey and Rousseau. His pictures are for the most part scenes in Turkey and other Oriental countries, and are notable for their rich coloring. Eleven of them were at the Paris Exposition in 1878, where he gained a medal of honor. *Turkey in Asia* and *The Door of a Khan at Brousse* were at the Salon in that year. His *Damascus* is in the Walters Gallery, Baltimore.

PASIPHÆ. See MINOS, Vol. XVI, p. 501.

PASO DEL NORTE, EL, a city of Mexico. See JUAREZ, in these Supplements.

PASPATI, ALEXANDER GEORGE, a Greek philologist and historian; born in the island of Scio, in 1814; captured in 1822 and sold into slavery at Smyrna; taken to the United States; graduated at Harvard in 1831; studied medicine in Paris and Pisa in 1834–39; a physician in Constantinople in 1840–78; and professor in the university at Athens. He was well versed in linguistic science, his philological investigations taking a wide range. His works were published in English, French and Greek, a number being devoted to an exposition of the modern Greek dialects and the Gypsy language and literature. They include *Études sur les Tchinghianés ou Bohémiens de l'Empire Ottoman* (1870); *The English Version of the Revised New Testament* (1882); etc. He died Dec. 24, 1891.

PASQUE-FLOWER. See HORTICULTURE, Vol. XII, p. 260.

PASSAGLIA, CARLO, an Italian theologian; born near Lucca, March 2, 1812; educated as a Jesuit; in 1844 became professor in the Collegio Romano. He left the Jesuits in 1859, and took an active part in the discussions as to the temporal power of the Pope. In 1861 he published his *Pro Causa Italica ad Episcopos Italianos*, in which he maintained that the secular power of the Pope was unnecessary, and counseled him to abandon it in obedience to the voice of united Italy. For this work he was compelled to leave Rome; King Victor Emmanuel at once appointed him professor of moral philosophy at the University of Turin. He was elected a member of the Italian Parliament in 1863, and opposed the occupation of Rome by the French. In 1882 he was reconciled to the Holy See and resumed ecclesiastical functions. He was one of the most learned theologians of Italy, and eminent for his eloquence. He died in Turin, March 12, 1887.

PASSAIC, a city of Passaic County, northern New Jersey, on the Passaic River, and on the Delaware, Lackawanna and Western, the New York, Lake Erie and Western and the New York, Susquehanna and Western railways, 11 miles by rail N.W. of Jersey City and 5 miles S.S.E. of Paterson. The city is beautifully situated on ground rising gradually as it is removed from the river, and from this high ground a view is obtained over a wide expanse of country. The public buildings include a city hall, public library, 15 churches and 6 school buildings. There are electric lights, electric street-railways, macadamized streets, water-works, fire and police departments, banks, clubs, two daily, one semiweekly and three weekly newspapers. The leading industries of the city are foundries and print-works, manufactories of woolens and shoddy, whips, india-rubber and chemicals. The Passaic River, on which the city of Passaic is situated, after rising in Morris County runs southeastward a short distance, then northeastward, forming the boundary between Essex and Morris counties enters Passaic County, and, after passing Paterson, where its course is marked by a fall of 72 feet, making attractive scenery and furnishing water-power for many factories, it flows south and empties into Newark Bay, three miles below Newark. It has a course of about one hundred miles, navigable a short distance from its mouth. Population 1890, 13,028; 1900, 27,777.

PASSAMAQUODDY BAY, an inlet opening out of the Bay of Fundy, forming part of the boundary between Maine and New Brunswick, having a length of about twelve miles and a width at the entrance of eight miles. It receives the St. Croix, Didgeguash, and other rivers; is deep, sheltered, and incloses several islands, of which Deer and Campobello have good harbors. The bay is the seat of important fisheries, is surrounded by picturesque scenery, and has tides averaging 25 feet in height.

PASSAVANT, WILLIAM ALFRED, an American clergyman; born in Zelienople, Pa., Oct. 9, 1821. He was educated at Jefferson College, and the Lutheran Theological Seminary, was ordained in 1842 and accepted a pastorate in Baltimore, Ind. He was in charge of a parish in Pittsburg, from 1844 to 1855, after which he devoted himself entirely to editorial and philanthropic work in connection with the Lutheran Church. He founded hospitals in Chicago, Milwaukee and

Pittsburg, and orphan asylums at Mount Vernon, N. Y., Rochester, Pa., and Zelienople, Pa. In co-operation with A. Louis Thiel he founded Thiel College at Greenville, Pa., in 1870 and in the next few years travelled about the country and secured funds for these institutions amounting to over $1,000,000. The order of deaconesses was introduced by him into the United States. He edited the *Missionary* at Pittsburg from 1845 to 1861, and in 1880 founded the *Workman* at Pittsburg, of which he was editor. He was one of the founders of the Lutheran Theological Seminary established in Chicago, Ill., in 1891. He died in Pittsburg, Pa., June 3, 1894. W.M.C.

PASSAVANT, WILLIAM ALFRED, JR., a clergyman, son of preceding; born in Pittsburg, Pa., Jan. 23, 1857; educated at Western University, Pittsburg, and Muhlenberg College and Theological Seminary, Philadelphia; entered the ministry in 1879, and became pastor at Baden and Pittsburg, Pa. He became editor of *The Workman* in 1887, and superintendent of English Home Missions of the General Council in 1889. On the death of his father, in 1894, he succeeded him in the care of the established benevolent institutions. He died July 1, 1901.

PASS CHRISTIAN, a town of Harrison County, Mississippi, in the southeastern part of the state, has risen into great prominence as a winter resort for health and pleasure. It lies on Mississippi Sound, fronting upon the Gulf of Mexico, near the Bayou St. Louis, and is on the Louisville and Nashville railroad, 82 miles from Mobile and 58 miles from New Orleans. It has a fine water front, with good and shaded roads, boating piers, bathing beach, etc., and is supplied with a number of hotels and boarding cottages, which give accommodation to a large transient population. The permanent population in 1900 was 2,028. W.F.J.

PASSENGER-PIGEON. See PIGEON, Vol. XIX, pp. 93, 94.

PASSERES, a large order of birds characterized by the arrangement of the bones of the palate and by the number and attachment of the song-muscles. It is nearly synonymous with *Passeriformis* and *Insessores* (q. v.). See SPARROW, Vol. XXII, p. 383. R.W.C.

PASSERINE BIRDS. See ORNITHOLOGY, Vol. XVIII, pp. 44, 45.

PASSION-FLOWER FAMILY. See PASSION-FLOWER, Vol. XVIII, pp. 347, 348.

PASSIONISTS, a religious congregation of priests of the Roman Catholic Church, the object of whose institute, indicated by their name, is to preach "Jesus Christ and Him crucified." The founder, St. Paul of the Cross, was born in 1694, near Genoa, obtained the sanction of Benedict XIV in 1741, and died at the mother-house of the society on the Cœlian Hill at Rome in 1775. The cross appears everywhere as their emblem, and a large crucifix forms a part of their very striking costume. For a time the congregation remained in obscurity; but in the first half of the nineteenth century it rose into notice. In 1842 it secured a footing in England. The American province, begun in 1852, numbers between one hundred and two hundred religious houses.

PASSION-PLAYS. See DRAMA, Vol. VII. See, also, OBER-AMMERGAU, in these Supplements.

PASSIVITY OF METALS. Some metals, such as iron, cobalt, nickel, and perhaps others, treated with a strong oxidizing agent, such as concentrated nitric or chromic acid, are no longer acted on by acids or many other reagents that usually attack them. This is probably due to the formation of a thin layer of oxide, which protects the rest of the metal. If the passive metal is heated in a reducing-gas, or rubbed or put in an acid in contact with platinum, it becomes active again. Gun-barrels are made passive to protect them from rusting. See ELECTROLYSIS, Vol. VIII, p. 103.

PASSPORTS. The use of passports in continental Europe and in times of peace has become much more infrequent of late years. But there are many advantages in possessing one in case of any accident or mishap to a traveler. The European law and practice is concisely stated under PASSPORT, q.v., Vol. XVIII, p. 349. The Department of State in America is charged with the issuance of passports. Its regulations and required formalities are briefly as follows:

Passports are issued only to citizens of the United States, upon application, supported by proof of citizenship. When the applicant is a native citizen of the United States he must transmit his own affidavit of this fact, stating his age and place of birth, with the certificate of one other citizen of the United States to whom he is personally known, stating that the declaration made by the applicant is true. The affidavit must be attested by a notary public, under his signature and seal of office. When there is no notary in the place, the affidavit may be made before a justice of the peace or other officer authorized to administer oaths; but if he has no seal, his official act must be authenticated by certificate of a court of record. A person born abroad who claims that his father was a native citizen of the United States must state in his affidavit that his father was born in the United States, has resided therein, and was a citizen of the same at the time of the applicant's birth. This affidavit must be supported by that of one other citizen acquainted with the facts.

If the applicant be a naturalized citizen, his certificate of naturalization must be transmitted for inspection (it will be returned with the passport), and he must state in his affidavit that he is the identical person described in the certificate presented. Passports cannot be issued to aliens who have only declared their intention to become citizens. Military service does not of itself confer citizenship. A person of alien birth, who has been honorably discharged from military service in the United States, but who has not been naturalized, should not transmit his discharge-paper in application for a passport, but should apply to the proper court for admission to citizenship, and transmit the certificate of naturalization so obtained. The signature to the application and oath of allegiance should conform in orthography to the applicant's name as written in the naturalization paper, which the department follows. Every applicant is required to state his occupation and the place of his permanent legal residence, and to declare that he goes abroad for temporary sojourn and intends to return to the United States with the purpose of residing and performing the duties of citizenship therein. The wife or widow of a naturalized citizen must transmit the naturalization certificate of the husband, stating in her affidavit that she is the wife or widow of the person described therein. The children of a naturalized citizen claiming citizenship through the father must transmit the

certificate of naturalization of the father, stating in their affidavits that they are children of the person described therein, and were minors at the time of such naturalization. The oath of allegiance to the United States will be required in all cases.

The application should be accompanied by a description of the person, stating the following particulars, viz.: Age:——years. Stature: ——feet ——inches (English measure). Forehead :——. Eyes:——. Nose:——. Mouth: ——. Chin:——. Hair:——. Complexion:——. Face: ——. If the applicant is to be accompanied by his wife, minor children, or servants, it will be sufficient to state the names and ages of such persons and their relationship to the applicant, when a single passport for the whole will suffice. For any other person in the party a separate passport will be required. A woman's passport may include her minor children and servants.

By act of Congress approved March 23, 1888, a fee of one dollar is required to be collected for every citizen's passport. That amount in currency or postal note should accompany each application. Orders should be payable to the disbursing clerk of the Department of State. Drafts or checks are inconvenient and undesirable. A passport is good for two years from its date, and no longer. A new one may be obtained by stating the date and number of the old one, paying the fee of one dollar, and furnishing satisfactory evidence that the applicant is at the time within the United States. The oath of allegiance must also be transmitted when the former passport was issued prior to 1861. Citizens of the United States desiring to obtain passports while in a foreign country must apply to the chief diplomatic representative of the United States in that country, or, in the absence of a diplomatic representative, then to the consul-general, if there be one, or, in the absence of both the officers last named, to a consul. Passports cannot be lawfully issued by state authorities, or by judicial or municipal functionaries of the United States. (Revised Statutes, section 4075.) To persons wishing to obtain passports for themselves, blank forms of application will be furnished by the Department of State on request, stating whether the applicant be a native or naturalized citizen, or claims citizenship through the naturalization of husband or parent. Communications should be addressed to the Department of State, indorsed, "Passport Division," and each communication should give the postoffice address of the person to whom the answer is to be directed. Professional titles will not be inserted in passports. Persons applying for blank forms for passports should state whether the forms are required for native or naturalized citizens, as there are several forms, each different to meet the case required, and it will often save time and trouble if this caution is observed.

Passports are necessary for the Turkish dominions, including Egypt and Palestine, and must be certified by a Turkish consular officer before entering Turkish jurisdiction. Persons quitting the United States with eventual purpose of visiting any part of Turkey, are advised that their passports may conveniently be certified in advance by the consul-general of Turkey at New York, thus avoiding possible difficulty in obtaining the prescribed *visa* in another country *en route*.

Persons traveling with United States passports desirous of entering Germany from France should not neglect to have their passports viséed by the consul-general of Germany at Paris, thus possibly saving themselves much inconvenience and delay.

It is also understood that in many of the large cities of Germany passports are required of all foreigners who therein take up even a short residence.

PASTA, Giuditta Judith, an Italian opera-singer; born of Jewish parents in Como, near Milan, April 9, 1798; educated in music in Como and at the Conservatoire, in Milan; married Pesta, a singer. Her first triumph was at Verona, in 1822. The next year she appeared at the Paris Italian Opera, where her singing was greatly admired. From 1825 to 1833 she sang in London, Paris and other cities. Her magnificent voice passed easily from the highest soprano notes to the gravest contralto tones; in addition she possessed fine dramatic power. *La Sonnambula* was written for her by Bellini; her principal rôles were Medea, Desdemona, Semiramide, Nina, Camilla, and Giulia in *Romeo e Giulia*. She retired from the stage in 1834, and died April 1, 1865.

PASTELS or PASTILS. See Crayon, Vol. VI, p. 492.

PASTEUR, Louis, a French chemist and biologist; born in Dôle, in the department of Jura, Dec. 27, 1822; received the degree of D.Sc. from the École Normale in 1847; professor of physics in the Faculty of Sciences, Strasburg, in 1849; dean of the Faculty of Sciences at Lille in 1854; "scientific director" of the École Normale, Paris, in 1857; professor of geology, physics and chemistry at the École des Beaux-Arts, Paris, in 1863; professor of chemistry at the Sorbonne in 1867. His work in molecular chemistry won him the Jecker prize in 1861; but he is noted chiefly for his discoveries in the chemistry of fermentation (see Fermentation, Vol. IX, pp. 84, 85) and in mycology (see Schizomycetes, Vol. XXI, p. 417). He ascertained the causes of certain deteriorations of wine, and found a preventive. His investigation of the disease of the silk-worm resulted in finding both the cause and the cure (see Silk, Vol. XXII, p. 65). He discovered the bacilli which cause anthrax in cattle, and a cure by inoculation (see Murrain, Vol. XVII, p. 65). He found the cause of hydrophobia to be a microbe in the nerve-centers, and its preventive and cure in the employment of an attenuated or "cultured" form of the same microbe (see Rabies, Vol. XX, p. 206). In 1888 he established the Pasteur Institute in Paris for the treatment of rabies, which was opened in the presence of President Carnot. In 1890 a hospital for the treatment of rabies by the Pasteur method was founded in New York City. In recognition of his services to science and industry he received in 1872 a prize of 10,000 florins from the Austrian Ministry of Agriculture; in 1873 one of 12,000 francs from the Société d' Encouragement; and in 1874 a life-pension of 12,000 francs from the French government. He was elected a member of the London Royal Society in 1869, and of the French Academy of the Institute of France in 1881. His seventieth birthday was celebrated before a brilliant official assembly at the Sorbonne, in 1892. He contributed many articles to scientific periodicals, and wrote *Nouvel Exemple de Fermentation* (1863); *Études sur le Vin* (1866); *Études sur le Vinaigre* (1868); *Études sur la Maladie*

LOUIS PASTEUR.

des Vers de Soie (1870); *Les Microbes* (1878). He died Sept. 28, 1895.

PASTOR, a bird. See STARLING, Vol. XXII, pp. 474, 475.

PATAPSCO RIVER. See MARYLAND, Vol. XV, p. 609.

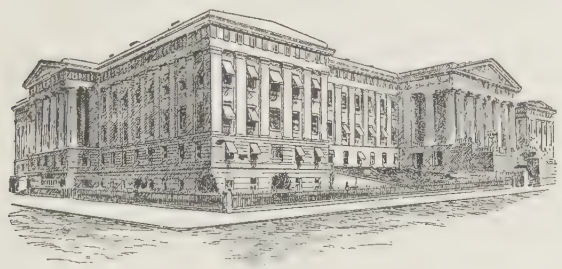
PATCHOGUE, a village of Suffolk County, southeastern New York, on Great South Bay on the southern shore of Long Island, 53 miles E. of New York City, and on the Long Island railroad. It has a harbor with good dock facilities, and is one of the most popular resorts on the Long Island coast. The most important industries are the taking and exporting of fish and oysters, shipbuilding and manufacture of lace, crape, paper, flour, sash and doors. The village was incorporated in 1893, and by the 12th census (1900) it had a population of 2,926.

PATELLA OR KNEE-PAN. See ANATOMY, Vol. I, p. 727.

PATELLIDÆ. See MOLLUSCA, Vol. XVI, pp. 668–671.

PATENT LAWS AND SYSTEM OF THE UNITED STATES, THE. Nearly every civilized nation has provided in a greater or lesser degree for the encouragement and protection of inventive skill and industry, and in some of the older European countries for generations exclusive privileges have been granted to the producers of things new and useful in art, science, literature and mechanics. The article on PATENTS, Vol. XVIII, pp. 359–363, being practical and present rather than historical, dealt with the English patent law and practice, and was restricted to a brief mention of the existing laws of America in this regard.

In colonial days the restrictive policy of the mother-country operated disastrously on patents as well as manufactures, and in consequence the



THE PATENT OFFICE, WASHINGTON, D. C.

American colonies had made little progress in arts or manufactures up to the signature of the Declaration of Independence. England's emissaries, the royal governors of colonies, were charged with the repression of every industry liable to enter into competition with the artisans at home. Nearly everything had to be imported in exchange for raw agricultural products, and rarely indeed were exclusive manufacturing privileges granted to exceptionally favored colonists in New England. Intercolonial trade was hampered and exportation to the West Indies stopped. Even the Bible was not to be printed in America. There was warrant enough for the words of the Declaration as to "cutting off our trade with all parts of the world." Few, indeed, could be classed under Andrew Marvell's (q. v., Vol. XV, pp. 595, 596) humorous *Character of Holland*, where

> "To make a bank was a great plot of state;
> Invent a shovel, and be a magistrate."

Even under this blighting influence, a forecast of America's prominence in inventive genius is to be found in the first recorded patent, granted to Joseph Jenks, of Lynn, Massachusetts, by special act of the General Court of Massachusetts Bay Colony, May 6, 1646. It related to improvements in water-mills, the making of scythes, and to improvements in saw-mills; and was followed in May, 1655, by another patent to the same inventor in respect to scythes. But there were few inventors and fewer patents until the first notes of the peal of liberty rang throughout the land.

FOUNDATION OF THE AMERICAN PATENT SYSTEM. Upon the experience and practical workings of the various systems of the Old World the American laws and practice have been founded, the English theories entering most largely into them. Prior to the adoption of the Federal Constitution, some of the states or provincial governments granted to inventors exclusive privileges, but for obvious reasons these were of little or no value. The foundation of the Republic, and the adoption in 1788 of a constitution wherein and whereby Congress was empowered "to promote the progress of science and useful arts by securing, for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries," were the first real steps toward the United States system of patents. Legislation soon ensued to shape generalities into practical form, and by an act of Congress, approved April 10, 1790, the first American patent system was founded. Thomas Jefferson inspired it, and may be said to have been the father of the American Patent Office. He took great pride in it, it is said, and gave personal consideration to every application that was made for a patent during the years between 1790 and 1793, while the power of revision and rejection granted by that act remained in force. It is related that the granting of a patent was held to be in these early times quite an event in the history of the State Department, where the clerical part of the work was then performed. It is a matter of tradition that when an application for a patent was made under the first act, Jefferson would summon Henry Knox of Massachusetts, who was Secretary of War, and Edmund Randolph of Virginia, who was Attorney-General, these officials being designated by the act, with the Secretary of State, as a tribunal to examine and grant patents; and that these three distinguished officials would examine the application critically, scrutinizing each point of the specification and claims carefully and rigorously. The result of this examination was, that during the first year a majority of the applications failed to pass the ordeal, and only three patents were granted. In those days every step in the issuing

of a patent was taken with great care and caution, Jefferson seeking always to impress upon the minds of his officers and the public that the granting of a patent was a matter of no ordinary importance. During the year 1791, 33 patents were granted; in 1792 the number was 11; and in 1793, 20—making 67 in all under the first statute.

The law of 1790, laying the foundation of the patent-system, constituted a tribunal consisting of the Secretary of State, the Secretary of War and the Attorney-General of the United States, whose duty it was, according to the language of the act, "to grant patents for any such useful art, manufacture, engine, machine or device as they should deem sufficiently useful and important." This language in the act was held to give this board authority to refuse patents for want of novelty in invention or insufficiency of utility or importance, which authority was, as before remarked, exercised with great rigor.

The first act required that patents should not be granted for more than fourteen years, and there was no provision for an extension. It required that "a written specification be filed with the Secretary of State, containing a description of the article desired to be patented, accompanied with drafts or models, and explanations and models." It also required that the specification should be so particular, and the models so exact, as not only to distinguish the invention or discovery from other things before known and used, but also to enable a workman or other person skilled in the art or manufacture whereof it was a branch, or wherewith it might be nearest connected, to make, construct or use the same, to the end that the public might have the full benefit thereof after the expiration of the patent term. This law also directed the Secretary of State to furnish copies of any such specification, and to permit any such models to be copied by any person making application therefor. The act also provided for the repeal of any patent obtained surreptitiously or by false suggestion, and that in all suits brought for the repeal of a patent so obtained, the original patent or specifications should be *prima facie* evidence of priority of invention. It provided no remedy for interfering applications, and apart from the thorough inspection it required it was, read by the light of the present practice, exceedingly defective. It was in many respects more equitable to all classes than the law which superseded it. There was no provision for an appeal from the decision of the tribunal above named by the act of 1790, and the strictness with which it exercised its powers was the cause of serious complaint. Inventors contended that these officers exercised arbitrary powers, and that they were, by education and interest, hostile to the classes who sought the benefits of the patent law.

There is no doubt but that this was true to a greater or less extent; or rather, it is true that they reluctantly granted patent privileges from a well-settled conviction that a too liberal exercise of that power would be detrimental to the interests of the country. Mr. Jefferson, however, if not his associates, held to the view that the patent law was not framed to collect revenue, but to encourage the production of something new and useful, and therefore believed in dealing liberally with those to whom patent rights were granted. The act of 1790 prescribed the following fees for the granting of patents, which are in striking contrast with those exacted by the act of 1793, which was framed by those who were supposed to favor the classes seeking patent privileges: "For receiving and filing the petition, fifty cents; for filing specifications, per copy-sheet containing one hundred words, ten cents; for making out the patent, two dollars; for affixing the great seal, one dollar; for indorsing the day of delivering the same to the patentee, including all intermediate services, twenty cents." When the patent under this act had passed the ordeal of the board, it still required the certificate of the Attorney-General and the signature of the President to make it complete. The impetus given to inventive genius by the act of 1790 created interests hostile to the power of revision and rejection which it authorized, and so rapidly did they develop that in 1793, by the act of February 24th, this power was destroyed, much to the detriment of the material interests of the country.

Just who drew the act of 1793 is not known, but that it met with Mr. Jefferson's opposition is a matter of history. It is said that he pointed out the consequences which would result from breaking down the barriers thrown around the granting of patents by the act of 1790, and held that the promiscuous granting of exclusive privileges, or "the creation of monopolies," as he called them, in any art or industry, was against the theory of popular government and pernicious in its effects. After the act of 1793 became a law, the control of the patent business still continued in the State Department.

There were remarkable differences between the two statutes. The act of 1790 made no distinction between citizens of the United States and aliens as to their rights under the patent law, but the act of 1793 refused patents to persons not citizens of the United States. By an act passed April 17, 1800, the law was so amended as to give aliens who had resided two years in this country the same rights as citizens, provided they filed an affidavit with their application, setting forth their desire and inclination to become citizens of the United States. The act of 1793 was in general construction much the same as that of 1790, except that the power of rejection was destroyed and the duty of granting patents lodged with the Secretary of State alone. It still required, however, the certificate of the Attorney-General as to the correctness of form to be affixed, and also the signature of the President. This statute provided that interfering applications should be submitted to the arbitration of three persons, one of whom was to be chosen by each of the applicants and the third to be appointed by the Secretary of State. The decision

of this tribunal was to be final, and if either party refused to go into arbitration the patent was to issue to the opposing party. There was no provision for an extension of a patent.

During the years from 1790 to 1802 a single clerk in the State Department performed the work of the Patent Office, and a dozen pigeonholes contained the entire records. In that year quite a noted scientific gentleman named Dr. Thornton was appointed by Mr. Jefferson to the office, and he was thereafter styled its "superintendent." For twenty-six years he was the autocrat of the Patent Office, and some amusing stories are related as to his management of its affairs. An official of the department relates that during his superintendence he conceived himself to be invested with much discretionary power, for he held to the maxim that "the patent-law was made solely for the encouragement of authors and inventors, and not to collect revenue." He would therefore exercise his judgment about the payment of fees, the result being that after his death there was quite a deficit between the amount that was and that which should have been to the credit of the patent fund in the treasury. During Dr. Thornton's administration of the office it was no unusual thing to find the doctor a co-patentee, while he was determining all questions which might arise under the law and the practice which he himself dictated.

Dr. Thornton took great interest in the office, and he dictated its action with a power that knew no master. The duties of his position not being onerous, he conducted an extended correspondence upon scientific subjects with the patent officials of the Old World and scientists generally, which he left as a part of the archives of the office when he died, "as a monument of his fidelity to and interest in the advancement of American mechanics." A story is told of him that during the War of 1812, when the British captured the city of Washington and destroyed the capitol building, a loaded cannon was trained upon the Patent Office for the purpose of destroying it, and he is said to have put himself before the gun, and in a frenzy of excitement exclaimed: "Are you Englishmen, or only Goths and Vandals? This is the Patent Office, a depository of the ingenuity and inventions of the American nation, in which the whole civilized world is interested. Would you destroy it? If so, fire away, and let the charge pass through my body." The effect is said to have been magical upon the soldiers, and to have saved the Patent Office from destruction.

A Mr. Jones succeeded Dr. Thornton as superintendent of the Patent Office, and from 1828 till 1830 administered its affairs. Dr. J. D. Craig succeeded to the position in the last-named year, and remained until 1836.

On the 28th of April, 1810, Congress passed an act authorizing the President to erect or procure by purchase a building suitable for the accommodation of the general postoffice and of the "office of the keeper of the patents," in such situation and finished in such manner as the interests of the United States and the safety and the convenience of those officers, respectively, and the arrangement of the models in the Patent Office should, in his opinion, require. The sum of $20,000 was appropriated for the purposes expressed in the act, and a building purchased on the site now occupied by the Postoffice Department. By act of March 7, 1812, a further appropriation of $9,553.91 was made to repair it. Previous to this time the Patent Office was in the building at present occupied by the War Department, and even at this early day so important a branch of the public service had it become that it was deemed best to provide more space for it. In 1812 it was removed to a building standing on the site occupied by the present Postoffice Department building, where it remained until destroyed by fire in 1836.

During the years from 1790 to 1812, inventors confined themselves almost wholly to agricultural and commercial objects. Implements for tilling the soil and converting its products, and machinery for navigation, attracted most attention. Manufactures, except of a purely domestic character for domestic purposes, were hardly known. The arts were poorly understood and little cultivated. The necessities of the New World drove its enterprise into other channels, and its people looked to Europe for manufactured products not directly connected with the necessities of life or demanded by the development of its commerce and agriculture. The War of 1812, however, forced our people to attempt production in many branches of manufacture and industry heretofore almost wholly uncultivated, and the result was the most remarkable development of human ingenuity ever known to any age or country. It is a source of great regret that no well-preserved history of American inventions dating from this time is in existence, and that no classified list of models which were in the office at the time of the fire in 1836 can be obtained. The earliest date that can be reached is Jan. 21, 1823, and that is only partially complete, but it gives the number in the most important classes as follows:

List of Models in the Patent Office, Jan. 21, 1823.

Propelling-boats	38
Carding-machines	8
Making carriage-wheels	4
Plows	65
Threshing-machines	20
Winnowing-machines	25
Bridges	13
Sawmills	26
Water-mills	17
Windmills	7
Water-wheels	26
Pumps	66
Presses	56
Looms	45
Stocking-looms	3
Spinning-machines	28
Fire-engines	10
Steam-mills	14
Nail-cutting machines	95
Machines for making barrels, etc	1
Mud-machines	7
Flax-dressing machines	6

File-cutting machines	6
Machines for cutting dye-woods	6
Cloth-shearing machines	16
Straw-cutting machines	10
Boring-machines	3
Locks	12
Guns	2
	635
For various other purposes	1,184
Total	1,819

These models were classified as follows:

I.—*Agriculture.* Plows, harrows, cultivators, planting, seeding, mowing and threshing machines, rakes, wheat-fans, straw-cutters, etc.

II.—*Factory Machinery.* For cotton, wool, flax, hemp, paper-rolling and slitting-mills, nail-cutters, etc.

III.—*Navigation.* Ships, boats, marine railways, canal-locks, mud-machines, dry-docks, etc.

IV.—*Land Works.* Railways, roads, bridges, excavating and boring machines, pile-engines, etc.

V.—*Common Trades.* Brick-making and planing machines, trip-hammers, bellows, turning-lathes, chains, washing-machines, household furniture and utensils; also, boots, shoes, saddles, harness, etc.

VI.—*Wheel Carriages.* Coaches, chairs, wagons, carts, waywisers, mail-bags, boats, etc.

VII.—*Hydraulics.* Pumps, fire-engines, hose-valves, etc.

VIII.—*Calorific and Steam Apparatus.* Furnaces, fire-places, stoves, boilers, stills, steam-engines, etc.

IX.—*Mills.* Water and other wheels, grist-mills, saw-mills and the various parts of their machinery.

X.—*Lever and Screw Power.* Applied to printing, coining and other presses.

XI.—*Arms.* Cannons, mortars, muskets, rifles, pistols, percussion and other locks, swords, etc.

XII.—*Mathematical Instruments.* For surveying, mining and nautical purposes.

XIII.—*Chemical Compositions.* Patent medicines, cements, dyes, etc.

XIV.—*Fine Arts.* Musical instruments, paints, varnishes, gildings, sculpture, architecture and gardening.

From 1790 to the re-organization of the Patent Office in 1836 there were granted 11,348 patents, a large number of which, on account of lack of novelty or usefulness, were valueless, but among them were some of the most important inventions of the age. The abuses which grew out of the promiscuous granting of patents without further inquiry than as to the payment of the fee and the form of the application, attracted public attention in the early part of the present century, but it was not until 1836 that opposition to this system was strong enough to invoke Congressional action. Early in that year Senator Ruggles, of Maine, who was the early champion of a reform of the abuses which the act of 1793 made possible, moved in the Senate for "a select committee of five to take into consideration the state and condition of the Patent Office and the laws relating to the issuing of patents for new and useful inventions and discoveries." The committee was appointed, and on the 28th day of April, of the same year, made an extended report, setting forth the abuses which had grown up as a necessary consequence of the act of 1793, and presented a bill for a re-organization of the Patent Office, which became a law on July 4, 1836.

The number of patents granted each year from 1790 to July 4, 1836, is as follows:

In 1790, 3; in 1791, 33; in 1792, 11; in 1793, 20; in 1794, 22; in 1795, 12; in 1796, 44; in 1797, 51; in 1798, 28; in 1799, 44; in 1800, 41; in 1801, 44; in 1802, 65; in 1803, 97; in 1804, 84; in 1805, 57; in 1806, 63; in 1807, 99; in 1808, 158; in 1809, 203; in 1810, 223; in 1811, 215; in 1812, 238; in 1813, 181; in 1814, 210; in 1815, 173; in 1816, 206; in 1817, 174; in 1818, 222; in 1819, 156; in 1820, 155; in 1821, 168; in 1822, 200; in 1823, 173; in 1824, 228; in 1825, 204; in 1826, 323; in 1827, 331; in 1828, 368; in 1829, 447; in 1830, 544; in 1831, 573; in 1832, 474; in 1833, 586; in 1834, 630; in 1835, 757; in 1836, 723.

The fees which were the results of this business had accumulated a surplus in the treasury, on Jan. 1, 1837, to the credit of the patent fund over and above all expenses incurred, of $156,907.73.

In remarkable contrast to the above results stands the record of business transacted by the office after its re-organization in 1836. The statement for the period extending from 1837 to 1896 is as follows:

The rapid increase of the patent business since 1836 can be readily seen by a comparison of the figures given in the two statements of the business of the office. From 1790 to 1837, a period of 46 years, 11,445 patents were granted, yielding a profit to the office of $156,907.73. From Jan. 1, 1837, to Sept. 30, 1877, a period of about 41 years, there were issued 192,332 patents, including reissues, which, together with the other business, placed to the credit of the patent fund on Sept. 30, 1877, $1,099,940.41.

From 1793 to 1868 the moneys earned by the Patent Office were kept as a separate fund in the Treasury, known as "the patent fund." The Commissioner of Patents drew against it for the expenses of his office, and the surplus, over and above the expenses, was kept intact and credited to this fund, and permitted to accumulate. On July 20, 1868, Congress passed an act "that all money to the credit of the patent fund, or in the hands of the Commissioner of Patents, and all moneys thereafter received at the Patent Office, for any purpose or from any source whatever, shall be paid into the treasury as received, without any deduction whatever." By this act the accumulation of the profits of the Patent Office for 75 years was turned into the common fund of the Treasury, and appropriations made for its support the same as for the other departments of the government. Although a separate account is kept with the Patent Office, there is no fund now intact in the Treasury representing its accumulations and known as "the patent fund."

PROVISIONS OF THE LAW OF 1836. The committee appointed by the Senate in 1836 presented with its report a bill for the re-organization of the Patent Office, which became a law on the 4th of July of the same year.

By this statute the Patent Office was created a bureau of the Department of State, whose chief officer was to be called Commissioner of Patents; he was to be appointed by the President, by and with the advice and consent of the Senate.

COMPARATIVE STATEMENT OF THE BUSINESS OF THE OFFICE FROM 1837 TO 1896, INCLUSIVE.

Year.	Applications.	Caveats Filed.	Patents and Reissues.	Cash Received.	Cash Expended.	Surplus.
1837	----------	----------	435	$ 29,289.08	$ 33,506.98	----------
1838	----------	----------	520	42,123.54	37,338.92	$ 4,784.62
1839	----------	----------	425	38,019.97	34,543.51	3,476.46
1840	765	228	473	38,056.51	39,020.67	----------
1841	847	312	495	40,413.01	52,666.87	----------
1842	761	291	517	36,505.63	31,241.73	5,264.20
1843	819	315	519	35,315.81	30,776.96	4,538.85
1844	1,045	380	497	42,509.26	36,344.53	6,164.73
1845	1,246	452	503	51,076.14	39,395.65	11,680.49
1846	1,272	448	638	50,264.16	46,158.71	4,105.45
1847	1,531	533	569	63,111.19	41,878.35	21,232.84
1848	1,628	607	653	67,576.69	58,905.84	8,670.85
1849	1,955	595	1,077	80,752.78	77,716.44	3,036.34
1850	2,193	602	993	86,927.05	80,100.95	6,826.10
1851	2,258	760	872	95,738.61	86,916.93	8,821.68
1852	2,639	996	1,019	112,056.34	95,916.91	16,139.43
1853	2,673	901	961	121,527.45	132,869.83	----------
1854	3,324	868	1,844	163,789.84	167,146.32	----------
1855	4,435	906	2,013	216,459.35	179,540.33	36,919.02
1856	4,960	1,024	2,505	192,588.02	199,931.02	----------
1857	4,771	1,010	2,896	196,132.01	211,582.09	----------
1858	5,364	943	3,710	203,716.16	193,193.74	10,522.42
1859	6,225	1,089	4,538	245,942.15	210,278.41	35,663.74
1860	7,653	1,084	4,819	256,352.50	252,820.80	3,531.79
1861	4,643	700	3,340	137,354.44	221,491.91	----------
1862	5,038	824	3,521	215,754.99	182,810.39	32,944.06
1863	6,014	787	4,170	195,593.29	189,414.14	6,179.15
1864	6,972	1,063	5,020	240,919.98	229,868.00	11,051.98
1865	10,664	1,937	6,616	348,791.84	274,199.34	74,592.50
1866	15,269	2,723	9,450	495,665.38	361,724.28	133,941.10
1867	21,276	3,597	13,015	646,581.92	639,263.32	7,318.60
1868	20,445	3,705	13,378	681,565.86	628,679.77	52,886.09
1869	19,271	3,624	13,986	693,145.81	486,430.74	206,715.07
1870	19,171	3,273	13,321	669,456.76	557,147.19	112,309.57
1871	19,472	3,366	13,033	678,716.46	562,091.64	116,624.82
1872	18,246	3,090	13,590	699,726.39	665,595.00	34,131.39
1873	20,414	3,248	12,864	703,191.77	691,178.98	12,012.79
1874	21,602	3,181	13,599	738,278.17	679,288.41	58,989.76
1875	21,638	3,094	14,837	743,453.36	721,657.71	21,795.65
1876	21,425	2,697	15,595	757,987.65	652,542.60	105,445.05
1877	20,308	2,809	14,187	732,342.85	613,152.62	119,190.23
1878	20,260	2,755	13,444	725,375.55	593,082.89	132,292.66
1879	20,059	2,620	13,213	703,931.47	529,638.97	174,292.50
1880	23,012	2,490	13,947	749,685.32	538,865.17	210,820.15
1881	26,059	2,406	16,584	853,665.89	605,173.28	248,492.61
1882	31,522	2,553	19,267	1,009,219.45	683,867.67	325,351.78
1883	34,576	2,741	22,383	1,146,240.00	675,234.86	471,005.14
1884	35,600	2,582	20,413	1,075,798.80	970,579.76	105,219.04
1885	35,717	2,552	24,233	1,188,089.15	1,024,378.85	163,710.30
1886	35,968	2,513	22,508	1,154,551.40	992,503.45	162,047.95
1887	35,613	2,622	21,477	1,144,509.60	994,472.22	150,037.38
1888	35,797	2,251	20,506	1,118,516.10	973,108.78	145,407.32
1889	40,575	2,481	24,158	1,281,728.05	1,052,955.96	228,772.09
1890	41,048	2,311	26,292	1,340,372.66	1,099,297.74	241,074.92
1891	40,552	2,408	23,244	1,271,285.78	1,139,713.35	131,572.43
1892	40,753	2,290	23,559	1,286,331.88	1,110,739.24	175,592.59
1893	38,473	2,247	23,769	1,242,871.64	1,141,038.45	101,833.19
1894	38,439	2,286	20,867	1,187,439.58	1,100,047.12	87,392.46
1895	40,680	2,415	22,057	1,245,246.93	1,084,496.51	160,750.42
1896	41,660	2,460	22,791	1,307,090.30	1,097,368.85	209,721.45

By the same act a chief clerk of the Patent Office was provided for, who was to have custody of the seal and of the records and models of the office, and was to perform all the duties of the Commissioner during his absence.

It also provided for an examining clerk at a salary of $1,500 a year, whose duties were the same as those of a principal examiner at present. Two clerks at $1,200 each and one at $1,000 were provided for, and also a machinist at $1,250 and a messenger at $700. The commissioner and chief clerk were both required to give bonds for the faithful performance of the duties of their office. Under this statute patents were to be issued for a term not exceeding 14 years, the fee for the same being $30. The patents might be extended for a period of seven years upon payment of an additional sum of $30, if the Secretary of State, the Commissioner of Patents and the Solicitor of the Treasury, who were by the act appointed a board to hear and decide upon the evidence for or against the extension, should

decide favorably. Notice of the extension was to be published in a Washington newspaper, and the board was to sit at the time and place given in the notice. This statute provided nearly the same regulations in relation to specifications, drawings and models as the original act of 1790. The same oath or affirmation as to the originality of the inventions was also preserved. The most important feature of all was, however, the system of examination into novelty and usefulness which this act provided, and which has had such marked influence upon the patent interests of the country.

This section of the law provided "that the Commissioner shall make, or cause to be made, an examination of the alleged new invention or discovery; and if, on any such examination, it shall not appear to the Commissioner that the same had been invented or discovered by any other person in this country prior to the alleged invention or discovery thereof by the applicant, or that it had been patented or described in any printed publication in this or any foreign country, or had been in public use or on sale with the applicant's consent or allowance prior to the application, if the Commissioner shall deem it to be sufficiently useful and important it shall be his duty to issue a patent therefor. But whenever, on such examination, it shall appear to the Commissioner that the applicant was not the original and first inventor or discoverer thereof, or that any part of that which is claimed as new had before been invented or discovered or patented or described in any printed publication in this or any foreign country, as aforesaid, or that the description is defective and insufficient, he shall notify the applicant thereof, giving him briefly such information and references as may be useful in judging of the propriety of renewing his application, or of altering his specification to embrace only that part of the invention or discovery which is new. In every such case, if the applicant shall elect to withdraw his application, relinquishing his claim to the model, he shall be entitled to receive back twenty dollars, part of the duty required by this act, on filing a notice in writing of such election in the Patent Office, a copy of which, certified by the Commissioner, shall be a sufficient warrant to the Treasurer for paying back to the said applicant the said sum of twenty dollars. But if the applicant in such case shall persist in his claim for a patent, with or without any alteration of his specification, he shall be required to make oath or affirmation anew in manner as aforesaid; and if the specification and claim shall not have been so modified as, in the opinion of the Commissioner, shall entitle the applicant to a patent, he may, on appeal and upon request in writing, have the decision of a board of examiners, to be composed of three disinterested persons, who shall be appointed for that purpose by the Secretary of State, one of whom, at least, to be selected, if practicable and convenient, for his knowledge and skill in the particular art, manufacture, or branch of science to which the alleged invention appertains, who shall be under oath or affirmation for the faithful and impartial performance of the duty imposed upon them by said appointment. Said board shall be furnished with a certificate in writing of the opinion and decision of the Commissioner, stating the particular grounds of his objection, and the part or parts of the invention which he considers as not entitled to be patented; and the said board shall give reasonable notice to the applicant, as well as to the Commissioner, of the time and place of their meeting, that they may have an opportunity of furnishing them with such facts and evidences as they may deem necessary to a just decision; and it shall be the duty of the Commissioner to furnish to the board of examiners such information as he may possess relative to the matter under their consideration; and on an examination and consideration of the matter by such board, it shall be in their power, or of a majority of them, to reverse the decision of the Commissioner, either in whole or in part, and, their opinion being certified to the Commissioner, he shall be governed thereby in the further proceedings to be had on such application: *Provided, however,* That before a board shall be instituted in any such case, the applicant shall pay to the credit of the Treasury, as provided in the ninth section of this act, the sum of twenty-five dollars, and each of said persons so appointed shall be entitled to receive for his services in each case a sum not exceeding ten dollars, to be determined and paid by the Commissioner out of any moneys in his hands, which shall be in full compensation to the persons who may be so appointed for their examination and certificate as aforesaid."

Under this act the present system of examination was instituted. The machinery which it constituted in case of an appeal being desired from the primary examiner remained in force until March 2, 1861, when Congress passed an act creating a tribunal consisting of three persons, to be known as examiners-in-chief. Previous to the establishment of this board it had been the practice of the office to detail three examiners to perform the work at present devolving upon the board of examiners-in-chief. But sometimes persons not connected with the office were called upon to act as judges in an appeal case. As a new board was organized for each case, there was often a want of harmony among its members regarding rules of procedure and lack of legal training evident in the decisions reached. When the patent business began to increase rapidly, this system failed to meet the demands of the office, in consequence of the great amount of litigation which arose. Hence the present Board of Appeal was constituted, whose duty it is to hear and determine all questions on appeal from the decisions of the primary examiners.

The statute of 1836 embodied most of the methods for disposing of interfering applications that are now in force. It also provided for an arrangement and classification of models in the office, so that they should be easy of access for study and inspection. This statute also laid the foundation for the creation of the present valuable scientific library of the office, and $1,500 was appropriated for it. Up to the time of the fire, in 1836, $1,000 had been spent upon a few unimportant books, which were all destroyed except a single volume of *Repertory of Arts.* This is now preserved in the United States Patent Office Library as the only existing relic of the conflagration of Dec. 15, 1836.

The statute of 1836 retained the discrimination in favor of American patentees, but it was so modified as to require a residence of only one year, and provided that a subject of Great Britain should pay $500 upon making his application and for all other foreign applicants the fee was $300. This discrimination was kept up in favor of American inventors until the act of March 2, 1861, abolished it. This law provided that there should be no discrimination against aliens unless the country to which they owed allegiance discriminated against citizens of the United States.

The law of 1836 created what is known as the caveat system, by which an inventor could, by paying $20, file in the Patent Office a caveat setting forth the design and purpose of his invention, its principal and distinguishing character-

istics, and praying for protection of his right until he could mature his invention. This paper was to be filed in the confidential archives of the office, and when the patent was taken out, the sum of $20 deposited as a fee for filing the caveat was to be applied upon the regular fees for issuing the patent.

This section also provided that if within one year from the time of filing the caveat any interfering application should be filed, it was the duty of the Commissioner to deposit his specification, drawings and model in the confidential archives of the office, and to give notice to the person filing the caveat of such interfering application, who must within three months mature his patent and file his description, specification, drawings and models, or lose the benefit of the security which the filing of his caveat gave him. This act continued in force exactly as it was passed until March 2, 1861, when the fee was reduced to $10, as at present; and the refunding of any part of the sum or placing it to the credit of the inventor, when application was finally made for a patent, was forbidden.

The tribunal which was created by Congress for the purpose of hearing and determining applications for extension of patents continued to exercise that power until May 27, 1848, when Congress passed an act which transferred that duty to the Commissioner of Patents alone. The Commissioner had sole authority for the extension of patents until March 2, 1861, when Congress passed an act extending the patent term to 17 years, and providing that a patent thereafter granted should not be extended. Extensions were, however, made after the passage of this law, of patents granted prior to 1861, but upon patents granted after that date it required a special act of Congress in each case for the commissioner to grant an extension. And it still requires special legislation to secure an extension.

The New Organization. Soon after the passage of the law of 1836 the Patent Office was reorganized, and Henry L. Ellsworth of Connecticut was appointed Commissioner of Patents, J. W Hand chief clerk, Chas. M. Keller examiner of patents, and Henry Stone draftsman.

By act of Congress of July 4, 1836, the sum of $108,000 was appropriated to build the present Patent Office. The foundations were laid in the fall, but while work was progressing the nation suffered an irreparable loss. On the morning of Dec. 15, 1836, the postoffice building was discovered to be on fire, and, although many of the archives of the general postoffice department were saved, not a thing was preserved in the Patent Office, save one volume from the library, of little value to any one.

The Committee on Postoffices and Post Roads submitted, Jan. 20, 1837, a report on the destruction of the postoffice, in which they said that the evidence taken was conclusive that the fire originated in the cellar under the city postoffice, but in which room they were unable to say with certainty.

On Dec. 19, 1836, on motion of Senator Ruggles of Maine, a committee of five was appointed to examine and report the extent of the loss sustained by the burning of the Patent Office, and to consider what measures ought to be adopted to repair the loss and to establish such evidences of property in patented inventions as the destruction of the models and drawings may have rendered necessary for its security. On Jan. 9, 1837, the committee made an extended report, in which they say: "The Patent Office contained the largest collection of models in the world. It was an object of just pride to every American able to appreciate its value as an item in the estimate of national character, or the advantages and benefits derivable from high improvement in the useful arts—a pride which must now stand rebuked by the improvidence which exposed so many memorials and evidences of the superiority of American genius to the destruction which has overtaken them. The number of models was about seven thousand. Many of them displayed great talent, ingenuity and mechanical science."

In addition to this report, this committee presented a bill in conformity with their views. This bill became a law on March 3, 1837. It gave any person in possession of a patent issued prior to Dec. 15, 1836, the right to record the same anew in the Patent Office, without charge, together with the descriptions, specifications and drawings belonging to the same. This law also imposed upon the Commissioner of Patents the duty of obtaining, as far as practicable, copies of patents, specifications, drawings, etc., for the purpose of having them transcribed and recorded. It also gave the Commissioner authority to record any authenticated copy of the original record, specification or drawing which he could obtain, and he was also permitted under this act to record any drawing produced as a delineation of the invention, if it was reinforced by an oath and referred to in the specification, even if it was not originally annexed to the patent.

Meanwhile, work progressed on the new Patent Office, which was completed for occupancy in 1852. An appropriation of $50,000 in March, 1849, transferred in the same act the Patent Office from the Department of State to the then newly created Department of the Interior.

The Patent Office was doomed to another and irreparable loss in its new quarters. There was a popular faith that whatever might be the security offered to the records of the government elsewhere, the important and valuable archives of the Department of the Interior were sheltered in a building nearly, if not wholly, fire-proof. Here were the records of the Land Office, Bureau of Indian Affairs and others of the many distinct bureaus connected with this department. Here, too, were the records, original drawings and models of the Patent Office, forming a collection of inestimable value and world-wide fame.

Shortly after eleven o'clock on the 24th of September, 1877, columns of smoke were seen issuing from its roof, and a shower of flying cin-

ders gave evidence that a serious fire had begun its work. So great was the faith of the officers, clerks and other employees of the department, however, in the security of the building against fire, that for some time the alarm did not create very great apprehension as to the safety of the building or its valuable contents.

Aid came from near-by towns, but when the fire was extinguished it was found that the Patent Office was almost the only sufferer, aside from the damage to the building. The roof and the model-rooms and contents on the west and north sides were completely destroyed. In these two halls were 87,000 models. Among them were several thousand known as "pending" and "issue" cases. The former were those cases in which the applications were still pending in the examiners' rooms, and the latter belonged to that class of cases allowed by the examiners and still awaiting the payment of the final fees. The loss of these fell on the inventors. The loss of rejected models was not serious. These models, in all cases where they were required, had been returned to the parties furnishing them. Some, which were of use as illustrating mechanics or applied science, had been, from time, to time, loaned to schools and seminaries, to be returned if called for. Most of those in the Ninth-Street loft, about twelve thousand in number, were practically valueless, and were kept only because of the possible injustice that might result if they were disposed of without notice to the applicants.

The loss by fire and water of photo-lithographic copies of drawings, it is estimated, amounted to 40,000 sets of 150 copies each, or about 600,000 copies in all. The drawings were copies only, and they could be replaced at an estimated expense of $60,000. Thirty patented drawings in the class of wood-working machinery, which were in the hands of tracers in the model-rooms, were lost, as were also the models. Three original patented drawings of different classes of inventions which were being traced in the model-room to fill orders from attorneys, were destroyed. Two of these, having been traced some three months back for photo-lithographic reproduction, were at once restored by being mounted upon card-board. There were also some ten drawings, specifications and models destroyed of incomplete applications, they being in the hands of model draftsmen in the west hall of the model-room who were engaged in making drawings therefrom to fill orders. Eleven volumes of English patented drawings were missing. Nine of them were known to be in the model-room and were undoubtedly destroyed. Other minor losses occurred.

The Present Patent Laws. The statutes were amended in 1861, and finally, in 1870, the provisions then in force were consolidated into a single code, which four years later became part of the Revised Statutes of the United States. The essence of the American system and its best feature is the examination before allowance by an examiner of patents. This examination relates to both the novelty and utility of the alleged invention. The latter question is easily disposed of, since, under the rulings of the office and the courts, every invention is considered "useful" if not actually found pernicious or dangerous. It sometimes occurs that a mechanical device is pronounced inoperative and a patent refused, but in such a case the applicant is allowed to file affidavits to the contrary. In fact, if the applicant's faith in the utility of his invention is strong enough to lead him to pay the office-fees, he is thought to be the best judge of this question.

The question of novelty is hard to decide. This is determined by a reference to American and foreign patents, printed scientific works in all languages, and all the information the examiner is able to collect from all sources relating to the art upon which he is especially employed.

The drawings of American patents are arranged by classes for the readiest reference. The English drawings are in bound volumes, with copious indexes and digests. These are kept in the library. In many examiners' rooms are manuscript digests, prepared with great labor, and setting forth the subject-matter of all patents belonging to the particular class under that examiner's special supervision. The library is filled with works on mechanics, and some that relate to every branch of industry.

With all these facilities, which are very imperfectly set forth here, the work of the examiner is intricate and delicate. It is an occurrence most rare for a device to be presented which is in all its features fully anticipated, either in some former patent or printed publication. The question usually turns upon distinctive claims for special features in the device, wherein it is alleged to differ from others of the same kind, and the solution of this question involves the nicest discrimination, both as to mechanical construction and interpretation of language and of law.

After a rejection of his claims, or any part of them, the applicant may amend them, and the new claims are again examined. A second rejection upon the same reference is "final," whereupon the applicant may, if he desires, take an appeal to the Board of Examiners-in-Chief. Should the board sustain the examiner in his decision, an appeal lies to the Commissioner in person. Should the examiner be reversed, the case is remanded to him for issue.

After rejection by the examiner, the applicant may amend at any time within two years; but if no action is made in that time, the application is considered abandoned.

All applications are examined in the order of their receipt by the examiner. The only exceptions to this rule are reissues, extensions and original applications in which the invention is deemed of special value to the government, and a request for its speedy examination is made by the head of an executive department.

Close study, thorough knowledge of the art, keen discernment and the highest intellectual

training are demanded of the examiner. The value of his work, in avoiding needless and expensive litigation, is inestimable.

The examination of an application prior to a grant of a patent, and the restriction of a patent to what is new therein, is, as has been said, the essence of the American patent system. The same plan has been adopted in a modified form by the government of the Dominion of Canada, and was favorably considered by the World's Patent Congress at Vienna in 1873, and by official representatives of the British and French governments, although it has not yet been adopted in those countries.

Several of the South American republics have patent systems copied mainly from that of the United States, but all these are yet in their infancy.

Of course there are objections that could be urged against the American system, but a careful review of the different systems in operation in the Old World, however, demonstrates the fact that the American practice produces more favorable results than any other, and is generally more satisfactory to all concerned, besides being more economical.

The American system requires a model, drawing and specification with each application, and a fee of $15. This fee pays for the examination, and in return for it the applicant is informed, from the best official data, as to whether his alleged invention is new in whole or in part. If it possesses novelty, he can obtain a patent by the payment of an additional $20, making $35 in all, as the fee for a patent for 17 years. (When a case is appealed from adverse decision of the examiner there are small additional fees.) The patent is published as soon as granted, and a certified copy of the specification and a photolithograph of the drawing sent to every United States court, where it is open to public inspection. Other copies are kept for sale by the Patent Office, and a digest of the case, containing the claims and vital part of the drawing, is published in the weekly *Official Gazette*, which is sent free to eight libraries in each Congressional district, and is sent to subscribers at $5 per annum.

A brief résumé of the rules of the patent office is as follows:

Applicants. A patent may be obtained by any person who has invented or discovered any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement thereof, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use or on sale in the United States for more than two years prior to his application, unless the same is proved to have been abandoned.

A patent may also be obtained by any person who, by his own industry, genius, efforts and expense, has invented and produced any new and original design for a manufacture, bust, statue, alto-relievo or bas-relief; any new and original design for the printing of woolen, silk, cotton or other fabrics; any new and original impression, ornament, pattern, print or picture to be printed, painted, cast or otherwise placed on or worked into any article of manufacture; or any new, useful and original shape or configuration of any article of manufacture, the same not having been known or used by others before his invention or production thereof, nor patented nor described in any printed publication, upon payment of the fees required by law and other due proceedings had.

If it appear that the inventor, at the time of making his application, believed himself to be the first inventor or discoverer, a patent will not be refused on account of the invention or discovery, or any part thereof, having been known or used in any foreign country before his invention or discovery thereof, if it had not been before patented or described in any printed publication.

Joint inventors are entitled to a joint patent; neither of them can obtain a patent for an invention jointly invented by them. Independent inventors of distinct and independent improvements in the same machine cannot obtain a joint patent for their separate inventions. The fact that one person furnishes the capital and another makes the invention does not entitle them to make an application as joint inventors; but in such case they may become joint patentees.

The receipt of letters-patent from a foreign government will not prevent the inventor from obtaining a patent in the United States unless the invention shall have been introduced into public use in the United States more than two years prior to the filing of the application. But every patent granted for an invention which has been previously patented by the same inventor in a foreign country will be so limited as to expire at the same time with the foreign patent, or, if there be more than one, at the same time with the one having the shortest unexpired term; but in no case will it be in force more than seventeen years.

The Application. Applications for letters-patent of the United States must be made to the Commissioner of Patents, and must be signed by the inventor, if alive. A complete application comprises the first fee of $15, a petition, specification and oath; and drawings, model or specimen when required. The petition, specification and oath must be in the English language.

The application must be completed and prepared for examination within two years after the filing of the petition; and in default thereof, or upon failure of the applicant to prosecute the same within two years after any action thereon, of which notice shall have been duly mailed to him or his agent, the application will be regarded as abandoned, unless it shall be shown to the satisfaction of the Commissioner that such delay was unavoidable.

The Petition. The petition must be addressed to the Commissioner of Patents, and must state the name and residence of the petitioner requesting the grant of a patent, designate by title the invention sought to be patented, contain a reference to the specification for a full disclosure of such invention, and must be signed by the applicant.

The Specification. The specification is a written description of the invention or discovery, and of the manner and process of making, constructing, compounding and using the same, and is required to be in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which the invention or discovery appertains, or with which it is most nearly connected, to make, construct, compound and use the same.

The specification must set forth the precise invention for which a patent is solicited and explain the principle thereof, and the best mode in which the applicant has contemplated applying that principle, in such manner as to distinguish it from other inventions.

In case of a mere improvement, the specification must particularly point out the parts to which the improvement relates, and must by explicit language distinguish between what is old and what is claimed as new; and the description and the drawings, as well as the claims, should be confined to the specific improvement and such parts as necessarily co-operate with it.

The specification must conclude with a specific and distinct claim or claims of the part, improvement or combination which the applicant regards as his invention or discovery.

When there are drawings, the description will refer to

the different views by figures and to the different parts by letters or numerals (preferably the latter).

The following order of arrangement should be observed in framing the specification: 1. Preamble stating the name and residence of the applicant, the title of the invention, and, if the invention, has been patented in any country, the country or countries in which it has been so patented, and the date and number of each patent. 2. General statement of the object and nature of the invention. 3. Brief description of the several views of the drawings (if the invention admits of such illustration). 4. Detailed description. 5. Claim or claims. 6. Signature of inventor. 7. Signatures of two witnesses.

The specification must be signed by the inventor or by his executor or administrator, and the signature must be attested by two witnesses. Full names must be given, and all names, whether of applicants or of witnesses, must be legibly written.

Two or more independent inventions cannot be claimed in one application; but where several distinct inventions are dependent upon each other and mutually contribute to produce a single result they may be claimed in one application.

If several inventions, claimed in a single application, be of such a nature that a single patent may not be issued to cover them, the inventor will be required to limit the description, drawing and claim of the pending application to whichever invention he may elect. The other inventions may be made the subjects of separate applications, which must conform to the rules applicable to original applications. If the independence of the inventions be clear, such limitation will be made before any action upon the merits; otherwise it may be made at any time before final action thereon, in the discretion of the examiner.

The specification and claims must be plainly written or printed on but one side of the paper. All interlineations and erasures must be clearly referred to in marginal or foot notes on the same sheet of paper. Legal-cap paper with the lines numbered is deemed preferable, and a wide margin must always be reserved upon the left-hand side of the page.

The Oath. The applicant, if the inventor, must make oath or affirmation that he does verily believe himself to be the original and first inventor or discoverer of the art, machine, manufacture, composition or improvement for which he solicits a patent; that he does not know and does not believe that the same was ever before known or used; and shall state of what country he is a citizen and where he resides. In every original application the applicant must distinctly state, under oath, whether the invention has or has not been patented to himself, or to others with his knowledge or consent, in any country, and, if it has been, the country or countries in which it has been so patented, giving the date and number of each patent; and should also state that it has not been patented, in any other country or countries than those mentioned, and that, according to his knowledge and belief, the invention has not been in public use or on sale in the United States for more than two years prior to the application in this country.

If such application shall be found to be patentable, on the payment of the final fee, or at some time before patent shall issue, applicant shall file a statement setting forth, by date and number, so far as known, any patents for the same invention, granted to him or to others with his knowledge or consent, between the date of the execution of the application and the date of such payment.

The oath or affirmation may be made before any person within the United States authorized by law to administer oaths, or, when the applicant resides in a foreign country, before any minister, chargé d'affaires, consul or commercial agent holding commission under the government of the United States, or before any notary public of the foreign country in which the applicant may be, the oath being attested in all cases, in this and other countries, by the proper official seal of the officer before whom the oath or affirmation is made.

The Drawings. The applicant for a patent is required by law to furnish a drawing of his invention whenever the nature of the case admits of it.

The drawing may be signed by the inventor, or the name of the inventor may be signed on the drawing by his attorney in fact, and must be attested by two witnesses. The drawing must show every feature of the invention covered by the claims.

The following rules are rigidly enforced:

Drawings must be made upon pure white paper of a thickness corresponding to three-sheet Bristol-board. The surface of the paper must be calendered and smooth. India ink alone must be used, to secure perfectly black and solid lines.

The size of a sheet on which a drawing is made must be exactly 10 by 15 inches. One inch from its edges a single marginal line is to be drawn, leaving the "sight" precisely 8 by 13 inches. Within this margin all work and signatures must be included.

All drawings must be made with the pen only. Every line and letter (signatures included) must be absolutely black.

Drawings should be made with the fewest lines possible consistent with clearness. By the observance of this rule the effectiveness of the work after reduction will be much increased. Shading (except on sectional views) should be used only on convex and concave surfaces, where it should be used sparingly, and may even there be dispensed with if the drawing is otherwise well executed.

The Model. Preliminary examinations will not be made for the purpose of determining whether models are required in particular cases. Applications complete in all other respects will be sent to the examining divisions, whether models are or are not furnished. A model will only be required or admitted as a part of the application when on examination of the case in its regular order the primary examiner shall find it to be necessary or useful. In such case, if a model has not been furnished, the examiner shall notify the applicant of such requirement, which will constitute an official action in the case.

The model must clearly exhibit every feature of the machine which forms the subject of a claim of invention, but should not include other matter than that covered by the actual invention or improvement, unless it be necessary to the exhibition of the invention in a working-model.

The model must be neatly and substantially made, of durable material, metal being deemed preferable; but when the material forms an essential feature of the invention, the model should be constructed of that material. The model must not be more than one foot in length, width or height, except in cases in which the Commissioner shall admit working-models of complicated machines of larger dimensions. If made of wood it must be painted or varnished. Glue must not be used; but the parts should be so connected as to resist the action of heat or moisture. When practicable, to prevent loss, the model or specimen should have the name of the inventor permanently fixed thereon. In cases where models are not made strong and substantial, as here directed, the application will not be examined until a proper model is furnished.

A working-model is often desirable, in order to enable the office fully and readily to understand the precise operation of the machine.

Specimens. When the invention or discovery is a composition of matter, the applicant, if required by the Commissioner, shall furnish specimens of the composition, and of its ingredients, sufficient in quantity for the purpose of experiment.

The Examination. Applications filed in the Patent Office are classified according to the various arts, and are taken up for examination in regular order of filing, those in the same class of invention being examined and disposed of, as far as practicable, in the order in which the respective applications are completed.

The first step in the examination of an application will be to determine whether it is, in all respects, in proper form. If, however, the objections as to form are not vital, the examiner shall proceed to the consideration of the application on its merits; and in such case he must, if possible, in his first letter to the applicant, state all his objections, whether formal or otherwise; and until the

formal objections are disposed of, further action will not be taken upon the merits without the order of the Commissioner.

Rejections and References. Whenever, on examination, any claim of an application is rejected for any reason whatever, the applicant will be notified thereof. The reason for such rejection will be fully and precisely stated, and such information and references will be given as may be useful in aiding the applicant to judge of the propriety of prosecuting his application or of altering his specification; and if, after receiving such notice, he shall persist in his claim, with or without altering his specification, the application will be re-examined. If upon re-examination the claim shall be again rejected, the reasons therefor will be fully and precisely stated.

Upon the rejection of an application for want of novelty, the examiner must cite the best references at his command.

Amendments and Actions by Applicants. The applicant has a right to amend before or after the first rejection or action; and he may amend as often as the examiner presents new references or reasons for rejection.

Designs. A patent for a design may be granted to any person in the cases specified upon payment of the fee required by law and other due proceedings had, as in cases of inventions or discoveries.

Patents for designs are granted for the term of three and one half years, or for seven years, or for fourteen years, as the applicant may, in his application, elect.

The proceedings in applications for patents for designs are substantially the same as in applications for other patents. The specification must distinctly point out the characteristic features of the design, and carefully distinguish between what is old and what is believed to be new. The following order of arrangement should be observed in framing the specification: 1. Preamble, stating name and residence of the applicant, title of the design, and the name of the article for which the design has been invented. 2. Detailed description of the design, as it appears in the drawing, letters or figures of reference being used. 3. Claim or claims. 4. Signature of inventor. 5. Signatures of two witnesses.

When the design can be sufficiently represented by drawings, a model will not be required.

Reissues. A reissue is granted to the original patentee, his legal representatives, or the assignees of the entire interest, when the original patent is inoperative or invalid by reason of a defective or insufficient specification, or by reason of the patentee claiming, as his invention or discovery, more than he had a right to claim as new, provided the error has arisen through inadvertence, accident or mistake, and without any fraudulent or deceptive intention.

Interferences. An interference is a proceeding instituted for the purpose of determining the question of priority of invention between two or more parties claiming substantially the same patentable invention. The fact that one of the parties has already obtained a patent will not prevent an interference, for, although the Commissioner has no power to cancel a patent, he may grant another patent for the same invention to a person who proves to be the prior inventor.

Appeals. Every applicant for a patent, any of the claims of whose application have been twice rejected for the same reasons, upon grounds involving the merits of the invention, such as lack of invention, novelty or utility, or on the ground of abandonment, public use or sale, inoperativeness of invention, aggregation of elements, incomplete combination of elements, or, when amended, for want of identity with the invention originally disclosed, or because the amendment involves a departure from the invention originally presented; and every applicant for the reissue of a patent whose claims have been twice rejected for any of the reasons above enumerated, or on the ground that the original patent is not "inoperative or invalid," or if so inoperative or invalid that the errors which rendered it so did not arise from "inadvertence, accident or mistake," may, upon payment of a fee of $10, appeal from the decision of the primary examiner to the examiners-in-chief. The appeal must set forth in writing the points of the decision upon which it is taken, and must be signed by the applicant or his duly authorized attorney or agent.

There must have been two rejections of the claims as originally filed, or, if amended in matter of substance, of the amended claims; and all the claims must have been passed upon, and all preliminary and intermediate questions relating to matters not affecting the merits of the invention settled, before the case can be appealed to the examiners-in-chief.

Issue. If, on examination, it shall appear that the applicant is justly entitled to a patent under the law, a notice of allowance will be sent him or his attorney, calling for the payment of the final fee within six months from the date of such notice of allowance, upon the receipt of which within the time fixed by law the patent will be prepared for issue.

After notice of the allowance of an application is given, the case will not be withdrawn from issue except by approval of the Commissioner, and if withdrawn for further action on the part of the office, a new notice of allowance will be given. When the final fee has been paid upon an application for letters-patent and the case has received its date and number, it will not be withdrawn or suspended from issue on account of any mistake or change of purpose of the applicant or his attorney, nor for the purpose of enabling the inventor to procure a foreign patent, nor for any other reasons except mistake on the part of the office, or because of fraud or illegality in the application, or for interference.

Date, Duration and Form of Patents. Every patent will bear date as of a day not later than six months from the time the application was passed and allowed and notice thereof was mailed to the applicant or his attorney, if within that period the final fee be paid to the Commissioner of Patents, or if it be paid to the Treasurer or any of the assistant treasurers or designated depositaries of the United States, and the certificate promptly forwarded to the Commissioner of Patents; and if the final fee be not paid within that period, the patent will be withheld.

A patent will not be antedated.

Every patent will contain a short title of the invention or discovery, indicating its nature and object, and a grant to the patentee, his heirs and assigns, for the term of seventeen years, of the exclusive right to make, use and vend the invention or discovery throughout the United States and the territories thereof. But if the invention has been previously patented abroad, the term of the patent will expire with the term of the foreign patent. The duration of a design patent may be for the term of three and a half, seven or fourteen years. A copy of the specifications and drawings will be annexed to the patent and form part thereof.

Delivery. The patent will be delivered or mailed on the day of its date to the patentee, unless there be an attorney of record, in which case it will be delivered to him or the patentee, as the attorney may request; but it will not, without a special request from the applicant, be delivered to an associate or substitute attorney.

Correction of Errors in Letters-Patent. Whenever a mistake, incurred through the fault of the office, is clearly disclosed by the records or files of the office, a certificate, stating the fact and nature of such mistake, signed by the Secretary of the Interior, countersigned by the Commissioner of Patents and sealed with the seal of the Patent Office, will, at the request of the patentee or his assignee, be indorsed without charge upon the letters-patent and recorded in the records of patents, and a printed copy thereof attached to each printed copy of the specification and drawing.

Whenever a mistake, incurred through the fault of the office, constitutes a sufficient legal ground for a reissue, such reissue will be made, for the correction of such mistake only, without charge of office fees, at the request of the patentee.

Mistakes not incurred through the fault of the office, and not affording legal grounds for reissues, will not be corrected after the delivery of the letters-patent to the patentee or his agent. Changes or corrections will not be made in letters-patent after the delivery thereof to the patentee or his attorney, except as above provided.

Abandoned, Forfeited, Revived, and Renewed Applications.

An abandoned application is one which has not been completed and prepared for examination within two years after the filing of the petition, or which the applicant has failed to prosecute within two years after any action therein, of which notice has been duly given or which the applicant has expressly abandoned by filing in the office a written declaration of abandonment, signed, by himself (and assignee if any), identifying his application by title of invention, serial number and date of filing.

Prosecution of an application to save it from abandonment must include such proper action as the condition of the case may require. The admission of an amendment not responsive to the last official action, or refusal to admit the same, and any proceedings relative thereto, shall not operate to save the application from abandonment under section 4894 of the Revised Statutes.

Before an application abandoned by failure to complete or prosecute can be revived as a pending application, it must be shown to the satisfaction of the Commissioner that the delay in the prosecution of the same was unavoidable.

When a new application is filed in place of an abandoned or rejected application, a new specification, oath, drawing and fee will be required; but the old model, if suitable, may be used.

A forfeited application is one upon which a patent has been withheld for failure to pay the final fee within the prescribed time.

Extensions. Patents cannot be extended except by act of Congress. An examination invariably precedes such action by Congress.

Disclaimers. Whenever, through inadvertence, accident or mistake, and without any fraudulent or deceptive intention, a patentee has claimed as his invention or discovery more than he had a right to claim as new, his patent shall be valid for all that part which is truly and justly his own, provided the same is a material or substantial part of the thing patented; and any such patentee, his heirs or assigns, whether of the whole or any sectional interest therein, may, on payment of the fee required by law (ten dollars), make disclaimer of such parts of the thing patented as he or they shall not choose to claim or to hold by virtue of the patent or assignment, stating therein the extent of his interest in such patent. Such disclaimer shall be in writing, attested by one or more witnesses, and recorded in the Patent Office; and it shall thereafter be considered as part of the original specification to the extent of the interest possessed by the claimant and by those claiming under him after the record thereof. But no such disclaimer shall affect any action pending at the time of filing the same, except as to the question of unreasonable neglect or delay in filing it.

Caveats. A caveat, under the patent law, is a notice given to the Patent Office of the caveator's claim as inventor, in order to prevent the grant of a patent to another person for the same alleged invention upon an application filed during the life of the caveat without notice to the caveator.

Any citizen of the United States who has made a new invention or discovery and desires further time to mature the same may, on payment of a fee of ten dollars, file in the Patent Office a caveat setting forth the object and the distinguishing characteristics of the invention, and praying protection of his right until he shall have matured his invention. Such caveat shall be filed in the confidential archives of the office and preserved in secrecy, and shall be operative for the term of one year from the filing thereof.

The caveat may be renewed, on request in writing, by the payment of a second caveat fee of ten dollars, and it will continue in force for one year from the date of the payment of such second fee. Subsequent renewals may be made with like effect. If a caveat be not renewed, it will still be preserved in the secret archives of the office.

An alien has the same privilege, if he has resided in the United States one year next preceding the filing of his caveat, and has made oath of his intention to become a citizen.

Assignments. Every patent or any interest therein shall be assignable in law by an instrument in writing, and the patentee or his assigns or legal representatives may, in like manner, grant and convey an exclusive right under the patent to the whole or any specified part of the United States.

Office Fees. Nearly all the fees payable to the Patent Office are positively required by law to be paid in advance; that is, upon making application for any action by the office for which a fee is payable. For the sake of uniformity and convenience, the remaining fees will be required to be paid in the same manner.

The following is the schedule of fees and of prices of publications, etc., of the Patent Office:

On filing each original application for a design patent for three years and six months	$10.00
On filing each original application for a design patent for seven years	15.00
On filing each original application for a design patent for fourteen years	30.00
On allowance of an application for a design patent, no further charge.	
On filing each caveat	10.00
On filing each original application for a patent	15.00
On allowance of an original application for a patent, except in design cases	20.00
On filing a disclaimer	10.00
On filing every application for the reissue of a patent	30.00
On filing each application for a division of a reissue	30.00
On allowance of an application for the reissue of a patent, no further charge.	
On filing every application for an extension of a patent	50.00
On the granting of every extension of a patent	50.00
On filing an appeal for the first time from a primary examiner or the examiner of interferences to the examiners-in-chief	10.00
On filing every appeal from the examiners-in-chief to the Commissioner	20.00
For manuscript copies of records in the English language, for every one hundred words or fraction thereof	.10
If certified, for the certificate, additional	.25
For copies of drawings not in print, the reasonable cost of making them.	
For uncertified copies of the specifications and accompanying drawings of all patents which are printed, per copy	.10
For twenty coupon orders, each coupon good until used for one copy of a printed specification and drawing	2.00
For certified copies of printed patents:	
For specification and drawing, per copy	.10
For the certificate	.25
For the grant	.50
For the specification, if not in print, for every one hundred words or fraction thereof	.10
For the drawings if in print	.10
For the drawings, if not in print, the reasonable cost of making them.	
For certifying to a duplicate of a model	.50
For abstracts of title to patents or inventions:	
For the certificate of search	1.00
For each brief from the digest of assignments	.20
For copies of matter in any foreign language, for every one hundred words or a fraction thereof,	.10
For translation, for every one hundred words or fraction thereof	.50
For recording every assignment, agreement, power of attorney, or other paper, of three hundred words or under	1.00
For recording every assignment, agreement, power of attorney, or other paper of over three hundred words and under one thousand words,	2.00
For recording every assignment, agreement, power of attorney, or other paper of over one thousand words	3.00
For assistance to attorneys and others in the examination of records, one hour or less	.50
Each additional hour or fraction thereof	.50
For assistance to attorneys in the examination of patents or other matter in the scientific library, one hour or less	1.00

For each additional hour or fraction thereof	1.00
For subscription to the *Official Gazette*, published every Tuesday, all subscriptions to commence with the beginning of a volume, none being taken for a less period than three months, and there being no club rates or discount to newsdealers, as follows:	
To all subscribers within the United States and Canada, one year	5.00
To foreign subscribers, except in Canada	7.00
Single numbers	.10
For bound volumes of the *Official Gazette*:	
Semiannual volumes, from Jan. 1, 1872, to June 30, 1883, full sheep binding, per volume	4.00
Semiannual volumes, from Jan. 1, 1872, to June 30, 1883, half sheep binding, per volume	3.50
Quarterly volumes subsequent to July 1, 1883, full sheep binding, per volume	2.75
For the annual index—lists of patentees and inventions, alphabetically arranged, with date of patent, number, etc., from January, 1872—one volume each year, full law binding, per volume	2.00
In paper covers, per volume	1.00
For the general index—a list of inventions patented from 1790 to 1873, with the name of inventor, residence, date of patent, number, etc.—three volumes full law binding, per set	10.00
For the index from 1790 to 1836—a list of inventions patented from 1790 to 1836, photolithographed from Patent-Office Reports—one volume, full law binding	5.00
For the monthly volumes, containing the specifications and photolithographed copies of the drawings of all patents issued during the month, certified, bound full sheep, per volume,	12.00
For the monthly volumes, containing the specifications and photolithographed copies of the drawings of all patents issued during the month, certified, bound half sheep, per volume,	10.00
For the index to patents relating to electricity, granted by the United States prior to June 30 1882, one volume, 250 pages, bound	5.00
In paper covers	3.00
Annual appendixes for each fiscal year subsequent to June 30, 1882, paper covers	1.50
For Commissioners' Decisions:	
For 1869–71, bound in one volume, full law binding	2.00
For 1872–74, bound in one volume, full law binding	2.00
For 1875–76, bound in one volume, with decisions of United States courts in patent cases, full law binding	2.00
For 1875–76, bound in paper covers	1.00
For 1877–83, one volume each year, with decisions of the United States courts, full law binding, per volume	2.00
For 1877–83, bound in paper covers	1.00
Pamphlet of the Rules of Practice	Free.
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Publications. The *Official Gazette*, a weekly publication which has been issued since 1872, takes the place of the old *Patent Office Report.* It contains the claims of all patents issued, including reissues, with portions of the drawings selected to illustrate the inventions claimed. It also contains decisions rendered by the courts in patent cases and by the Commissioner of Patents, and other special matters of interest to inventors.

The *Gazette* is furnished to subscribers at the rate of $5 per annum. When sent abroad an additional charge of $2 is made for the payment of postage. Representatives and senators are each entitled to a copy, and each is entitled to designate eight public libraries to which the *Gazette* will be sent without charge. Single copies are furnished for ten cents each.

An index is published annually, which is sent to all subscribers and designated libraries without additional cost.

Printed volumes are issued monthly, containing the entire specifications and drawings of all patents issued during the previous month. These are authenticated by the seal of the office, and may be used as evidence throughout the United States. One copy is deposited in the Library of Congress and in each state and territorial library, and one copy in the custody of the clerk of each United States district court, for general reference.

RULES AND FORMS ADOPTED FOR THE REGISTRATION OF TRADE-MARKS UNDER THE ACT OF 1881.

Who May Obtain Registration. Any person, firm or corporation domiciled in the United States or located in any foreign country which, by treaty, convention, or law affords similar privileges to citizens of the United States,* and who is entitled to the exclusive use of any trade-mark and uses the same in commerce with foreign nations or with Indian tribes.

Any citizen or resident of this country wishing the protection of his trade-mark in any foreign country the laws of which require registration in the United States as a condition precedent.

Statutory Requirements. Every applicant for registration of a trade-mark must cause to be recorded in the Patent-Office—

The name, domicile and place of business or location of the firm or corporation desiring the protection of the trade-mark, and the residence and citizenship of individual applicants.

The class of merchandise and the particular description of goods comprised in such class to which the trade-mark has been appropriated.

A description of the trade-mark itself, with fac-similes thereof, and the mode in which it has been applied and used.

The length of time during which the trade-mark has been used by the applicant on the class of goods described.

A fee of $25 is required on filing each application, except in the cases hereinafter named.

The Application. An application for the registration of a trade-mark will consist of a statement or specification, a declaration or oath, and the fac-simile with duplicates thereof. The statement and declaration should be written on one side of the paper only.

These should be preceded by a brief letter of advice requesting registration and signed by the applicant.

The statement should announce the full name, citizenship, domicile, residence and place of business of the applicant (or, if the applicant be a corporation, under the laws of what state or nation incorporated), with a full and clear specification of the trade-mark, particularly discriminating between its essential and non-essential features. It should also state from what time the trade-mark has been used by the applicant, the class of merchandise and the particular goods comprised in such class

* The following is a list of the governments with which conventions for the reciprocal registration and protection of trade-marks have been entered into by the United States, with the dates of the respective conventions. The laws of Switzerland and the Netherlands being so framed as to afford reciprocal privileges to the citizens or subjects of any government which affords similar privileges to the people of those countries, the mere exchange of diplomatic notes, giving notice of the fact, accomplishes all the purposes of a formal convention.

Austria-Hungary	June 1, 1872
Belgium	July 30, 1869
Belgium	July 9, 1884
Brazil	Sept. 24, 1878
France	Apr. 16, 1869
German Empire	June 1, 1872
Great Britain	July 17, 1878
Italy	Mar. 19, 1884
Russia	June 27, 1868
Servia	Dec. 27, 1882
Spain	Apr. 19, 1883
Switzerland	May 16, 1883
The Netherlands	Feb. 16, 1883

The declaration with Great Britain is drawn so as to confer mutual trade-mark rights upon the subjects and citizens of each of the contracting parties throughout the dominions and possessions of the other. Citizens or residents of British colonies are therefore permitted to register their trade-marks under this treaty whenever it is satisfactorily shown that in the respective colonies similar protection is afforded to citizens of the United States.

The following governments are members of the International Union for the Protection of Industrial Property, created by the convention at Paris, of March, 1883, to which the United States acceded in 1887: Belgium, Brazil, the Dominican Republic, France, Great Britain, Guatemala, Italy, The Netherlands, Norway, Portugal, San Salvador, Servia, Spain, Sweden, Switzerland, Tunis.

The people of the French and Spanish colonies, Dutch East India colonies, and the British colonies of New Zealand and Queensland are entitled to the benefit of this convention.

to which the trade-mark is appropriated, and the manner in which the trade-mark has been applied to the goods.

The declaration should be in the form of an oath by the person or by a member of the firm or by an officer of the corporation making the application, to the effect that the party has at the time of filing his application a right to the use of the trade-mark described in the statement; that no other person, firm or corporation has a right to such use, either in the identical form or in such near resemblance thereto as might be calculated to deceive; that such trade-mark is used in lawful commerce with foreign nations or Indian tribes, one or more of which should be particularly named; and that it is truly represented in the fac-simile presented for registry.

Fac-Similes to be Filed. An applicant for registration of a trade-mark must in every case, which admits of it, furnish a drawing thereof which conforms to the rules for drawings of mechanical patents. If for any reason such drawing does not constitute a satisfactory fac-simile of the trade-mark, two copies of the trade-mark, as actually used, must be deposited in addition to the required drawing, to be preserved in the office for reference.

Proceedings in the Office. All applications for registration are considered in the first instance by the trade-mark examiner. An adverse decision by such examiner upon the applicant's right to registration will be reviewed by the Commissioner in person upon petition without fee.

No trade-mark will be registered unless it shall be made to appear that the same is used as such by the applicant in commerce between the United States and some foreign nation or Indian tribe, or is within the provisions of a treaty, convention or declaration with a foreign power, nor which is merely the name of the applicant, nor which is identical with a known or registered trade-mark owned by another and appropriated to the same class of merchandise, or which so nearly resembles some other person's lawful trade-mark as to be likely to cause confusion in the mind of the public or to deceive purchasers, or which is merely descriptive in its nature.

The statement may be amended to correct informalities or to avoid objections made by the office, or for other reasons arising in the course of examination; but no amendments will be admitted unless warranted by something in the statement or fac-simile as originally filed. In respect to amendments the established rules in regard to applications for patents will be observed. The declaration cannot be amended. If that filed with the application is faulty or defective, a substitute declaration may be filed.

In case of conflicting applications for registration, or in any dispute as to the right to use which may arise between an applicant and a prior registrant, the office will declare an interference, in order that the parties may have an opportunity to prove priority of adoption or right; and the proceedings on such interference will follow, as nearly as practicable, the practice in interferences upon applications for patents; but each applicant and registrant will be held to the date of adoption alleged in the statement filed with his application. On the petition of any party dissatisfied with the decision of the examiner of interferences, the case will be reviewed by the Commissioner without fee.

When these requirements have been complied with, and the office has adjudged the trade-mark lawfully registrable, a certificate will be issued by the Commissioner, under seal of the Interior Department, to the effect that applicant has complied with the law, and that he is entitled to the protection of his trade-mark in such case made and provided. Attached to the certificate will be a fac-simile of the trade-mark and a printed copy of the statement and declaration.

The protection for such trade-mark will remain in force for thirty years, and may, upon the payment of a second fee, be renewed for thirty years longer, except in cases where such trade-mark is claimed for and applied to articles not manufactured in this country, and in which it receives protection under the laws of any foreign country for a shorter period, in which case it will cease to have force in this country, by virtue of the registration, at the same time that the trade-mark ceases to be exclusive property elsewhere.

The right to the use of any trade-mark is assignable by an instrument in writing, and provision is made for recording such instrument in the Patent Office. But no such instrument or conveyance will be recorded unless the trade-mark shall have first been registered as provided by law; and it must be identified by its certificate number. No particular form of instrument is prescribed.

The *Official Gazette* of the Patent Office will contain a list of all trade-marks registered, with the name and address of the registrant, an illustration of the trade-mark, a brief statement of its essential features, and the particular description of goods to which it is applied.

Fees:

On filing an application for registration of a trade-mark	$25.00
For abstract of title:	
For the certificate of search	1.00
For each brief from the digests of assignments.	.20
For copies of matter in any foreign language, for every 100 words or fraction thereof	.10
For translation, for every 100 words or fraction thereof	.50
For recording every assignment, agreement, power of attorney, or other paper, of 300 words or under	1.00
For recording every assignment, agreement, power of attorney, or other paper of over 300 words and under 1,000 words	2.00
For recording every assignment, agreement, power of attorney, or other paper of over 1,000 words,	3.00
For assistance to attorneys and others in the examination of records, one hour or less	.50
Each additional hour or fraction thereof	.50
For single printed copy of statement and declaration	.10
If certified, for the certificate, additional	.25
Single copy of the *Official Gazette*	.10
Annual subscription *Official Gazette*	5.00

REGISTRATION OF PRINTS AND LABELS.

Sections 3, 4 and 5 of the act of Congress relating to patents, trade-marks and copyrights, approved June 18, 1874 (18 Statutes at Large, p. 78) provide as follows:

SEC. 3. That in the construction of this act the words "engraving, cut, and print" shall be applied only to pictorial illustrations or works connected with the fine arts, and no prints or labels designed to be used for any other articles of manufacture shall be entered under the copyright law, but may be registered in the Patent Office. And the Commissioner of Patents is hereby charged with the supervision and control of the entry or registry of such prints or labels, in conformity with the regulations provided by law as to copyright of prints, except that there shall be paid for recording the title of any print or label not a trade-mark $6, which shall cover the expense of furnishing a copy of the record, under the seal of the Commissioner of Patents, to the party entering the same.

SEC. 4. That all laws and parts of laws inconsistent with the foregoing provisions be and the same are hereby repealed.

SEC. 5. That this act shall take effect on and after the first day of August, eighteen hundred and seventy-four.

The words "prints" and "labels" as used in this act so far as it relates to registration in the Patent Office are construed as synonymous, and are defined as any device, picture, word or words, figure or figures (not a trade-mark) impressed or stamped directly upon the articles of manufacture, or upon a slip or piece of paper, or other material, to be attached in any manner to manufactured articles, or to bottles, boxes and packages containing them, to indicate the contents of the package, the name of the manufacturer, or the place of manufacture, the quality of goods, directions for use, etc.

By the words "articles of manufacture" (to which such print or label is applicable by this act) is meant all vendible commodities produced by hand, machinery or art.

But no such print or label can be registered unless it properly belongs to an article of commerce, and be as above defined; nor can the same be registered as such print or label when it amounts to a lawful trade-mark, or when its use in connection with the article to which it is applied is arbitrary or fanciful.

To entitle the owner of any such print or label to register the same in the Patent Office, it is necessary that five copies of the same be filed, one of which copies shall be certified under the seal of the Commissioner of Patents, and returned to the registrant.

The certificate of such registration will continue in force for twenty-eight years.

It has been held in a United States circuit court that the use of a label in the sale of the merchandise it is intended to designate prior to the deposit of such label in the Patent Office amounts to a publication thereof (Marsh *et al. vs.* Warren *et al.*, XIV O. G., 678.) Since in the same decision the court held that in a suit for infringement of a registered label the bill must aver that the title and label were deposited before publication, it is evident that any such use will vitiate a registration subsequently effected.

The fee for registration of a print or label is $6, to be paid in the same manner as fees for patents.

The benefits of this act seem to have been originally confined to citizens or residents of the United States, but are extended by existing treaties to British, German, Italian and Belgian subjects.

BIBLIOGRAPHY. The bibliography of the United States patent system is extensive. The patent laws, rules of procedure and annual reports of the Commissioner of Patent afford a valuable insight into the actual working of the system, while *The Official Gazette of the United States Patent Office* is the most authoritative chronicle of all applications received and patents granted. *An Account of the Destruction by Fire of the Patent Office* (1877) is full of valuable historical data, and L. H. Campbell's *The Patent System* is a valuable work from the pen of one of the examiners. Turning to the more legal text-books, mention may be made of O. F. Bump's *Law of Patents, Trade-Marks and Copyright* (1877); R. M. Clapp's *Law in Patents and Decisions of the Courts* (1885); C. E. Coddington's *Digest of Law of Trade-Marks* (1877); H. C. Merwin's *Patentability of Inventions* (1883); C. S. Whitman's *Patent Laws and Practice* (1879); H. T. Fenton's *Law of Patents for Designs* (1889); G. H. Knight's *Patent Office Manual* (1893); and W. C. Robinson's valuable and voluminous *Law of Patents for Useful Inventions* (3 vols., 1890). The legal text-books relative to the English law and practice of patents are mentioned in Sonnenschein's *Best Books.*

PATER, Walter Horatio, an English critic in literature and art; born in London, Aug. 4, 1839. He was educated at King's School, Canterbury, and at Queen's College, Oxford, taking a second-class in classics in 1862. Three years later he was elected a fellow of Brasenose College, and there, for a time, acted as dean and lecturer. He then traveled on the European continent. In Italy, especially, with a student's enthusiasm, he familiarized himself with the scenes and historic mementoes of the classical and mediæval eras of which he was afterward exquisitely to write. Pater began his literary career by contributing a paper on Coleridge's works to the *Westminster Review*, and in 1873 he published a series of essays on art and letters, entitled *Studies in the History of the Renaissance.* This was followed, in 1885, by *Marius the Epicurean, His Sensations and Ideas*, being the imaginary mental history of a youth educated in Roman paganism and perplexed with the problem of life. In 1887 appeared four artistic stories under the title of *Imaginary Portraits*, and in 1889 a volume of appreciative literary criticism, with an essay on style, entitled *Appreciations. Plato and Platonism* followed in 1893, and after his death appeared *Greek Studies* (1894), and *Gaston de Latour* (1896), an unfinished romance of much splendor of phrase and setting. Mr. Pater's death, at Oxford, July 30, 1894, at a comparatively early age, was a great loss, for he was a writer of subtle and searching insight, while his literary style has given new attractions to art, as well as a new delight to lovers of Greek ideals and the Greek spirit.

PATERNITY. See Medical Jurisprudence, Vol. XV, p. 790.

PATERNOSTER, a tackle. See Angling, Vol. II, p. 33.

PATERSON, the "Lyons of America," a city of considerable size and importance in New Jersey. It has exceptional railroad facilities by the New York, Lake Erie and Western, New York, Susquehanna and Western and the Delaware, Lackawanna and Western railways; is connected with the Delaware River by canal, and a proposal has been made to render the Passaic River navigable to Paterson. The returns of 1900 showed 73 industries in 995 establishments, with $43,510,481 in capital, giving employment to 31,432 persons, paying $14,430,537 and having annual products worth $52,287,975. Of these industries, silk was easily the most important, having 136 establishments, furnishing employment to 16,545 persons, paying $7,027,561 in wages, having a capital of $19,025,564, and producing goods to the value of $26,006,156. Of the many other important industries the most important are foundries and machine-shops, employing over 4,000 hands; dyeing and finishing works; iron and steels works; manufactures of jute and jute goods; malt liquor establishments; linen-thread plant; and numerous building trades.

The assessed valuation of city property in 1900, at about 30 per cent of the market value, was $38,824,280; the municipal debt, $1,605,993; and city taxes limited to 2½ per cent of total valuation. The city has good paved and macadamized streets, 35 miles of electric street-railways, electric lights, water-works, paid fire department, good school system embracing 17 well-equipped buildings, 200 teachers, 64 churches, 31 public halls, 2 parks, large public library, 2 large hospitals, 2 orphan asylums, old ladies' home, 3 national banks with combined capital of $850,000, savings and private banks, 6 daily and 7 weekly newspapers and a monthly periodical. Population 1890, 78,347; 1900, 105,171. See also Paterson, Vol. XVIII, p. 364.

PATHROS. See Egypt, Vol. VII, p. 607.

PATKUL, Johann Reginald (1660–1707). See Charles XII, Vol. V, p. 364.

PATMORE, Coventry Kearsey Deighton, a British poet; born in Woodford, England, July 23, 1823, the son of P. G. Patmore, author of *Literary Reminiscences.* He published a volume of *Poems* in 1844, and three years later joined the staff of librarians in the British Museum, where he remained till 1868. Soon after he settled at Hastings, where he built a large Catholic church. His second volume of poems, *Tamerton Church Tower*, etc., prepared the way for his greatest work, *The Angel in the House*, an exquisite and sincere poem of love from the domestic side, which has had a great popularity. Patmore edited the anthology entitled *The Children's Garland from the Best Poets;* the *Autobiography* of Barry Cornwall; the posthumous poems of his son, Henry Patmore; and *Florilegium Amantis*, a selection from his own poems (1888). Died Nov. 26, 1896.

PATON, John Gibson, a Scotch missionary; born in the parish of Kirkmahoe, May 24, 1824. After some experience in Glasgow City Mission, he offered

his services for the foreign mission-field in connection with the Reformed Presbyterian Church, and in 1858 became missionary in Tanna, New Hebrides. Here he labored, amidst trials and difficulties, till 1862, when he was forced to leave, owing to the hostility of the natives. In the interest of the New Hebrides mission he visited Australia in 1862–63, Great Britain in 1863–64, and the Australian colonies in 1865, when he became missionary on the neighboring island of Aniwa, the whole population of which becoming Christian. He again visited Great Britain and North America in 1892–94. He was a delegate to the Pan-Presbyterian Church in Belfast in 1884, and at Toronto in 1892. His autobiography, edited by his brother, was published in 1889.

PATON, Sir Joseph Noel, a Scotch historical painter; born in Dunfermline, Dec. 13, 1821; and studied for a time at the Royal Academy, London. His cartoon sketch, *The Spirit of Religion*, gained one of the three premiums at the Westminster Hall competition in 1845. Two years thereafter, his oil picture of *Christ Bearing the Cross* and his *Reconciliation of Oberon and Titania* jointly gained the prize of $1,500. *Dante Meditating the Episode of Francesca* was exhibited in Edinburgh in 1852; *The Dead Lady*, in 1854; and *The Pursuit of Pleasure*, in 1855. Among his other pictures are *Home from the Crimea; In Memoriam*, a scene from the Indian Mutiny; and a series of six pictures-illustrations of *Dowie Dens o' Yarrow*. He was queen's limner for Scotland, was the author of two volumes of poems, and received the degree of LL.D., from Edinburgh. He died at Edinburgh, Dec. 26, 1901. R.C.A.

PATRICK, Marcena Richard, an American soldier; born in Jefferson County, N. Y., March 15, 1811. He was graduated from the United States Military Academy in 1835. In 1847 he was promoted to captain and for service in the Mexican War was brevetted major. He resigned from the army in 1850 and in 1859 was appointed president of the New York State Agricultural College. In the Civil War he was appointed brigadier-general, March 17, 1862. He commanded a brigade in Gen. Doubleday's division at the battle of Antietam and was provost-marshal general of the combined armies before Richmond. After the war he was appointed governor of the National Soldiers' Home in Dayton, Ohio. He died there July 27, 1888. W.M.C.

PATRIOTIC SOCIETIES. See Colonial Societies and Genealogies, in these Supplements.

PATRIPASSIANS. See Jesus, Vol. XIII, p. 681.

PATROCLUS. See Achilles, Vol. I, pp. 89, 90.

PATRONAGE. See Advowson, Vol. I, p. 162.

PATRONS OF HUSBANDRY. See Farmers' Organizations, in these Supplements.

PATROONS. See New York, Vol. XVII, p. 466.

PATTEE, Fred Lewis, an American educationist and author; born in Bristol, New Hampshire, March 22, 1866; educated at New Hampton Institution and at Dartmouth College, from which latter institution he graduated in 1888. He was the poet of his class. After serving as principal of high schools in Eatontown, New Jersey, and in Mendon, Massachusetts, he was, in 1890, made principal of Coe's Academy, Northwood, New Hampshire, where he served four years. After 1894 he was professor of English and rhetoric in the Pennsylvania State College. He published *Literature in the Public Schools* (1891); *The Wine of May, and Other Lyrics* (1893); *Pasquaney*, sketches of a New Hampshire lake (1894); *A History of American Literature, with a View to the Fundamental Principles Underlying Its Development* (1896). He contributed the articles American Literature and Canadian Literature, in these Supplements.

PATTEN, Simon Nelson, political economist; born in Sandwich, Ill., May 1, 1852. He was educated at the Northwestern University, Evanston, Ill., and at the University of Halle, Germany, where he graduated Ph.D. in 1878. For ten years after his return home he taught in the Illinois and Iowa public schools, and in special sociological and economic branches, and in 1888 was elected to the chair of political economy in the University of Pennsylvania. He is the author of valuable works on economics, including *Premises of Political Economy* (1885); *The Consumption of Wealth* (1889); *The Theory of Social Forces* (1896), etc. G.J.H.

PATTERSON, Daniel T., an American naval officer; born in New York, March 6, 1786. He entered the navy in 1800, and was attached to the *Philadelphia* when she surrendered to Tripolitan gunboats in October, 1803. He remained a prisoner in Tripoli until peace was concluded in 1805. In 1807 he was promoted lieutenant, and in 1813 master commandant. In 1814 he commanded the naval forces at New Orleans, and co-operated so ably with Gen. Jackson that he received the thanks of Congress. He was promoted captain in February, 1815, was navy commissioner, 1828–32, and in command of a squadron in the Mediterranean, 1832–35. He died, while in command of the navy yard at Washington, D. C., Aug. 15, 1839. E.E.T.

PATTERSON, Carlisle Pollock, an American civil engineer and naval officer, son of D. T. Patterson; born in Shieldsboro, Miss., Aug. 24, 1816. He entered the navy as midshipman in 1830, and after a foreign cruise graduated as a civil engineer at Georgetown College. From 1836 to 1845 he was a member of the United States Coast Survey. In 1849 he retired from the navy and entered the merchant service, commanding the Pacific mail steamship *Oregon* from 1850 to 1860. He was hydrographic inspector and superintendent of the United States Coast Survey from 1861 to 1881. He was also a member of the United States Lighthouse Board and for 20 years was editor of the *Annual Reports* of the United States Coast and Geodetic Survey. He died in Washington, D. C., Aug. 15, 1881. W.M.C.

PATTERSON, Robert, an American soldier; born in Cappagh, County Tyrone, Ireland, June 12, 1792. He was educated in the public schools of Philadelphia, and served as a 1st lieu-

tenant in the War of 1812. He became a prominent merchant of Philadelphia, and was one of the "five Colonel Pattersons" who nominated Jackson for the Presidency. He served in the Mexican War and at the outbreak of the Civil War was made a major-general and placed in command of the Department of Washington. When Gen. McDowell's army advanced into Virginia, Patterson was instructed to remain at Winchester to hold in check the superior forces of the Confederate Gen. J. E. Johnston. His failure to do this, in consequence of which Johnston, reenforcing Beauregard on the battlefield of Bull Run, July 21, 1861, gave the victory to the Confederates, exposed him to severe criticism. On July 27, 1861, he was honorably discharged from the service. In 1865 he published *A Narrative of the Campaign in the Valley of the Shenandoah* in explanation of his conduct of affairs at Bull Run. He died in Philadelphia, Pa., Aug. 7, 1881.

W.M.C.

PATTERSON-BONAPARTE. See BONAPARTE, ELIZABETH PATTERSON, in these Supplements.

PATTI, ADELINA MARIA CLORINDA, prima donna; born of Italian parents in Madrid, Spain, Feb. 19, 1843. In the following year her parents settled in New York city, where her father, Salvatore Patti, became one of the managers of the Italian Opera House in Chambers street. Adelina was first taught music by her half-brother, Ettore Barili, and at the age of seven years began her public career by appearing in the concerts at Tripler's Hall, New York. In 1855, at the age of twelve, she made a tour through the West Indies, being accompanied by the pianist, Gottschalk. On Nov. 24, 1859, she made her first appearance as an operatic singer in New York in the Italian opera, *Lucia di Lammermoor*. She was at once received with great cordiality. Later she devoted two years to study, and then at the age of eighteen, made her *début* as *Amina* in *La Sonnambula* at the Italian Opera House in Covent Garden, London, where she achieved an enthusiastic success, the ablest critics recognizing her as a singer of the highest excellence. In 1862–68 she sang in Paris at the Theatre Italien. While there she created the title rôle in Verdi's *La Jeann d'Arc*, and appeared for the first in *Il Trovatore*. She made many tours through Europe and Great Britain, which brought her world wide fame. In 1881–84 she toured the United States, receiving $5,000 per night for her services. In 1888–89 she traveled in South America at the same remuneration. She revisited the United States in 1892, 1893 and 1903. In December, 1894, she sang before Queen Victoria at Windsor, receiving in reward an autograph portrait of the queen and an ornament of rubies and diamonds on which were the letters V.R.I.

MADAME PATTI.

G.J.H.

PATTI, CARLOTTA, an Italian vocalist, a sister of Adelina Patti; born in Florence, Italy, June, 1840. She received early instruction as a pianist but later devoted her talents to vocal music, and made her first appearance in concert in New York City in 1861. She sang in London and the leading continental cities in 1862 and 1863. She married Ernest de Munck, a celebrated violoncellist, Sept. 3, 1879. Her voice was a very high, flexible soprano, and but for an unfortunate lameness she would have achieved success upon the operatic stage. Her last concert appearance in New York was in 1875. She died in Paris, France, June 27, 1889.

W.M.C.

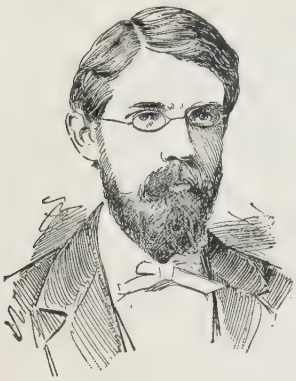
PATTISON, MARK, an English scholar and author; born in Hornby, Yorkshire, in 1813. He received his bachelor's degree from Oriel College, Oxford, in 1836, and three years later was elected to a fellowship in Lincoln College. He contributed to the columns of the *Quarterly*, the *Westminster* and the *Saturday Review*. His *Report on Elementary Education in Protestant Germany* appeared in 1859, and his paper on *Tendencies of Religious Thought in England, 1688–1750*, in *Essays and Reviews* in 1860. In 1861 he was elected rector of his college, and the next year married Emilia Frances Strong, afterward Lady Dilke, who helped him to make Lincoln a social and intellectual center. Besides the books already named, he published *Suggestions on Academical Organization* (1868); Pope's *Essay on Man* (1869); and *Satires and Epistles* (1872); *Isaac Casaubon, 1559–1614* (1875); *Milton*, of the English Men of Letters Series (1879); the *Sonnets of Milton* (1883); and *Sermons* (1885). A volume of his *Memoirs* was published in 1885, and a collection of his *Essays* in 1889. He died at Harrowgate, July 30, 1884.—His sister, DORA WYNDLOW, a nurse, was born in Hauxwell, Jan. 16, 1832. The heroic devotion of Florence Nightingale kindled her enthusiasm, and in 1861 she started a life of labor for others as school teacher at Little Woolston. In 1864 she joined the sisterhood of the Good Samaritans at Coatham, and labored as nurse, first at North Ormesby, and in 1865 at Walsall. She braved the horrors of small-pox in 1868, and again in 1875, but her uncommon strength gave way, and she died in Walsall, Dec. 24, 1878. The workingmen erected a monument to her memory in 1886.

Revised by R.W.C.

PATTISON, ROBERT EMORY, lawyer; born in Quantico, Somerset Co., Md., Dec. 8, 1850; was educated at the Central High School of Philadelphia; admitted to the bar in 1872; comptroller of Philadelphia in 1877–82; Democratic governor of Pennsylvania in 1882–86 and 1891–95; defeated for governor in 1902; died Aug. 1, 1904. G.J.H.

PATTON, FRANCIS LANDEY, theologian; born in Warwick Parish, Bermuda, Jan. 22, 1843; was graduated at the University of Toronto, Canada, and at Princeton Theological Seminary in 1865, and was ordained a minister of the Presbyterian Church, June 1 of the same year. He

was then installed pastor of the Eighty-fourth Street Presbyterian Church of New York. He remained there till 1867 when he took charge of the Presbyterian Church at Nyack, N. Y. After spending four years in this pastorate he was called to the South Presbyterian Church of Brooklyn. He remained in Brooklyn one year only, being called, in 1872, to the chair of theology at the Seminary of the Northwest (now McCormick Seminary), Chicago. He held this professorship till 1881, and in connection with it was pastor of the Park Presbyterian Church of Chicago from 1874. He was chosen professor of relations of philosophy and science to the Christian religion in 1881 at Princeton Theological Seminary. This chair had been founded and endowed for him by the late Robert L. Stewart. In connection with this professorship he also accepted that of ethics in Princeton University in 1886. Two years afterward he was elected president of the university, resigning his chair in the seminary. He remained president of the university till 1902, when he resigned and was elected president of the Princeton Theological Seminary. G.J.H.



DR. PATTON.

PATUXENT RIVER. See MARYLAND, Vol. XV, p. 609.

PAUL, EPISTLES OF. See PASTORAL EPISTLES, Vol. XVIII, pp. 425–440; and the specific names of his other epistles, as GALATIANS, CORINTHIANS, etc., in this ENCYCLOPÆDIA.

PAULDING, a village and the capital of a county of the same name, west-northwestern Ohio, 40 miles N.W. of Lima and about 60 miles S.W. of Toledo, on the Cincinnati, Jackson and Mackinaw railroad. It is the center of a region producing corn, wheat, oats, butter, hay, wool, live-stock, and ship timber, and has manufactures of lumber. Pop. 1900, 2,080.

PAULDING, JOHN, an American soldier and patriot; born in New York City in 1758. At the outbreak of the Revolution he enlisted in the Federal army and served throughout the war. He was three times taken prisoner and thrice escaped. He was one of the captors of Major André, and as a reward received a medal from Congress and a pension of $200. He died in Yorktown, Feb. 18, 1818. In 1827 a monument was erected over his remains at Peekskill, N. Y., and one was also erected at Tarrytown, N. Y., on the spot where André was captured. It has the figures of Paulding and his companions searching André for secret documents. W.M.C.

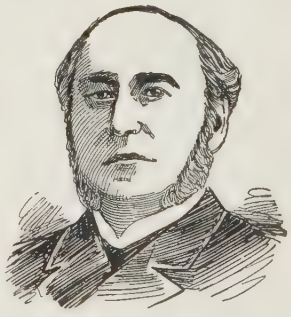
PAULIST FATHERS, an American Roman Catholic missionary society, organized in New York City in 1858, and approved by Pope Pius IX. The society was originally and for some years afterward composed exclusively of priests, who, like its founder, Father Isaac Thomas Hecker, were converts from Protestantism. They take no special vows, and can leave the order at will. They aim to adapt themselves to the usages and needs of American life. They are known collectively as *The Congregation of St. Paul the Apostle.*

PAULOWNIA, a genus of Japanese trees, of a single species, *P. imperialis* belonging to the family *Scrophulariaceæ*, or figworts. It is cultivated for ornament, has large heart-shaped catalpa-like leaves, violet flowers in a large terminal panicle, and turgid pods filled with numerous winged seeds.

PAULSEN, FRIEDRICH, a German philosopher; born at Langenhorn, Schleswig, July 16, 1846; educated at the universities of Erlangen, Bonn and Berlin; in 1878, professor extraordinary, and in 1893 professor ordinary of philosophy and pedagogy at the University of Berlin. Of his works are to be mentioned *Das Realgymnasium und die Humanistische Bildung* (1889); *System der Ethik mit einem Umriss der Staats-und Gesellschaftslehre* (1889); *Immanuel Kant, Sein Leben und Seine Lehre* (1899); *Schopenhauer, Hamlet, Mephistopheles, Drei Aufsätze zur Naturgeschichte des Pessimismus* (1900); *Philosophia Militans, Gegen Klerikalismus und Naturalismus* (1901); *Die Deutschen Universitäten und das Universitäts-Studium* (1902); *Einleitung in die Philosophie* (9th ed., 1903.). G.A.S.

PAULUS, ÆGINETA. See ÆGINETA, Vol. I. p. 164.

PAUNCEFOTE, SIR JULIAN, a British jurist and statesman; born in Munich, Bavaria, Sept. 13, 1828; and educated at Paris, Geneva, and at Marlborough College. He was called to the bar at the Inner Temple in 1852, joined the Oxford circuit, and also practiced as a conveyancer. He was appointed attorney-general of Hongkong in May, 1865; acted as chief justice of the supreme court in 1869; and in 1874 was knighted by patent. In 1873 he was appointed chief justice of the Leeward Islands; in 1874 Assistant Under-Secretary of State for the Colonies; and in 1876 Assistant (legal) Under-Secretary of State for Foreign Affairs. He was created a C.B. and K.C.M.G. in 1880, and in 1882 became Permanent Under-Secretary for Foreign Affairs. In 1885 he received the grand cross of St. Michael and St. George. In 1888 he became British ambassador at Washington; in 1892 received the grand cross of the Bath for his services; and in 1893 was made ambassador extraordinary and plenipotentiary to the United States. In 1894, during a visit home, he was sworn of the Privy Council. In 1899 he was a member of the International Peace Conference at The Hague. He died May 24, 1902.



LORD PAUNCEFOTE.

PAUPERISM. See POOR-LAWS, Vol. XIX, pp. 476–496; and in these Supplements.

PAUROPIDÆ. See CENTIPEDES, Vol. V, p. 296.

PAVEMENTS. See ROADS AND STREETS, Vol. XX, pp. 597–604.

PAVY, OCTAVE PIERRE, naturalist and explorer; one of the heroes of Arctic adventure; was of French ancestry, and was born in New Orleans, Louisiana, in June, 1844. He was educated in Paris as a physician and naturalist, and then returned to America to practice his profession. He became interested in Arctic research, and was commissioned as acting assistant surgeon and was sent north with the Greely expedition to Lady Franklin Bay — one of the ring of circumpolar observation stations. He did much work as a naturalist, made some valuable collections, and discovered a river and a valley which were named for him, but his chief work was done in keeping his comrades alive at Cape Sabine when provisions failed and disease and starvation attacked them. By heroic exertions he saved the lives of most of the party, but he himself died a few days before relief reached the camp, in June, 1884. W.F.J.

PAWNBROKING, a system of money-lending in which the borrower "pledges" or gives as security, his personal or household effects. It has existed in some form among all peoples from earliest times, but its early history is so closely allied with that of usury and banking that it cannot be separated from them, and its evolutionary processes from the time of the Mosaic law to that of the Romans, are unknown. It is probable, however, that banking developed out of pawnbroking.

Up to the fifteenth century the business had been largely carried on by the Jews, but on account of the extortionate rates of interest exacted by them, and influenced perhaps by religious prejudice, European governments began to found or sanction quasi-benevolent institutions, called *monts-de-piété* which lent money at low rates of interest, or gratuitously. These pawn-banks exist in most of the European countries to-day. In Belgium the interest varies from four to six per cent. a year; and in Holland, from five to eighteen per cent. In Germany the maximum rate is two per cent. a month for sums of $7.50 or less, and one per cent. on all larger sums; and in France the maximum rate is six per cent., with a fixed charge of one per cent.

In England, in 1199, the legal rate of interest was fixed at ten per cent., but as the Jewish brokers continued to charge from forty-five to sixty-five per cent., they were, in 1290, expelled from the country. Many Lombard merchants from Italian cities also carried on the pawnbroking business in England, among them being members of the Medici family, from whose armorial bearings the sign of the three golden balls is said to have been derived. These merchants were also expelled from the country, in 1530, for charging exorbitant rates of interest. During the reigns of James I, Charles II, William III, and George I, many plans were tried for regulating the pawnbroking business, but governmental proprietorship, such as prevailed in continental countries, was never adopted.

"Of the history of pledges or pawns in the United States," says Tyler in his work on *Usury*, "there is but little recorded or to be found in books upon the subject. The practice of pledging personal property for the security of claims dates back to the earliest settlements in the country, and the regular business of pawnbroking has been carried on as long, sometimes without the express sanction of statute except as is regulated by the authorities of cities, or generally controlled by rules enforced according to the common law."

In most of the states annual license fees, varying from $25 to $400, are exacted; and in many states bonds, of $300 to $10,000, are required. The monthly rate of interest prescribed by law varies from two to ten per cent., and extra charges are forbidden. In the cases of New York and New Mexico, however, the interest restriction is rendered practically nugatory by the fact that extra charges are not limited. The legal rate of interest in Connecticut is twenty-five per cent. annually; in New Mexico, ten per cent. monthly; and in New York (the law applies only to cities of 200,000 or over) on sums not exceeding $100 three per cent. per month for the first six months and two per cent. per month thereafter, and on sums over $100 two per cent. per month for the first six months and one per cent. thereafter.

Eight states limit the length of the loan, the shortest and longest periods being four months in Massachusetts, and one year in New Jersey, New York, and the District of Columbia. Nearly all of the states having laws on the subject require that unredeemed articles must be disposed of at auction at the expiration of the prescribed time, and the surplus realized (if any) above the amount of the loan and the interest, returned to the owner. In Maine, Idaho, Colorado, Alabama, Texas and Virginia, however, this provision is rendered practically inoperative from the fact that no limit is set to the length of the loan. Vermont is the only state that has made no law concerning pawnbroking, but in several states the only enactments made by the legislatures, have been those giving the power of regulating the business to the municipalities.

Although the United States, like England, has avoided governmental participation in the pawnbroking business, there are in most of the large cities of the country, loan associations which correspond in many respects to the *monts-de-piété* of Europe. R.W.C.

PAWNEE, a city and the capital of Pawnee County, northeastern Oklahoma, on Bear Creek. Its nearest railroad station is Red Rock, on the Atchison, Topeka and Santa Fé railroad, about 25 miles northwest. Perry, 30 miles westward, is the nearest important city. Pawnee is of very recent growth, and in 1900 had a population of 1,464.

PAWNEES OR PANI, a tribe of North American Indians, comprising the four tribes of Lanks, Republican Panis, Grand Panis and Tapage Panis. Their original location was in the region of the Platte River. They constantly fought the Sioux, the Sacs and Foxes, the Arapahoes and the Kiowas. In

1833 they surrendered their lands south of the Nebraska to the United States government, and for a time lived peaceably on a reservation north of that river. Later, defeated by the Sioux, they retreated to the south of the Nebraska, and in 1876 moved into the Indian Territory. In 1870 they numbered about 3,000; in 1885, 1,045; and in 1895, 710. See also INDIANS, Vol. XII, pp. 865, 871.

PAWNEE CITY, a village and the capital of Pawnee County, southeastern Nebraska, about 60 miles S.E. of Lincoln, on the Burlington and Missouri River in Nebraska and the Chicago, Rock Island and Pacific railroads. It is situated in a farming and grazing district, producing corn, wheat, hay, butter, pork and live-stock. Building-stone, timber, peat and fire-clay are found. Population 1890, 1,550; 1900, 1,969.

PAW PAW, a village and the capital of Van Buren County, southwestern southern peninsula of Michigan, on the Paw Paw River, and on the South Haven and Eastern railroad, 20 miles W.S.W. of Kalamazoo. It has an excellent water-power, flour-mill, large creamery, foundry and machine-shops, and a trade in wheat, lumber and fruit. Population 1890, 1,391; 1900, 1,465.

PAWPAW. See PAPAW, in these Supplements.

PAWTUCKET, a city of Rhode Island, on Pawtucket River, about 4 miles N.E. of Providence. In 1890 Pawtucket had two lines of railways, the New York and New England and the New York, New Haven and Hartford. The returns for the year 1900 showed 70 industries, in 534 establishments, capitalized at $22,399,187, employing 13,328 persons, to whom were paid $6,011,896, and turning out products valued at $24,080,328. The leading industry is the manufacture of cotton goods, including cotton thread. Others include the manufacture of hosiery and knit-goods, dyeing and finishing of textiles, one establishment alone turning out 20,000,000 yards of calico annually; manufacture of foundry and machine-shop products; slaughtering and meat-packing. There is a large shipping trade in coal, lumber, bricks, cement, etc. The city has a public park, laid out at a cost of almost $1,500,000; a public library, good public schools, three national banks with combined capital of $800,000, and a like number of savings banks with aggregate deposits of over $3,000,000; street-railways and electric-light plants, and three daily and four weekly newspapers. Population 1890, 27,633; 1900, 39,231. See also PAWTUCKET, Vol. XVIII, p. 450.

PAXTON, a city and the capital of Ford County, northeastern central Illinois, 49 miles E. of Bloomington, and about 100 miles S.S.W. of Chicago, on the Illinois Central and the Lake Erie and Western railroads. It is an important shipping-point for farm produce and live-stock, has brick and tile works, carriage and plow factories and a flour-mill. The city has water-works and electric-light plant, and is the seat of Rice Collegiate Institute, a co-educational institution for secondary instruction, established by the Congregationalists in 1878. Population 1890, 2,187; 1900, 3,036.

PAYER, JULIUS, an Austrian painter and explorer; born near Teplitz, Austria, Sept. 1, 1842. He was educated at the military college of Neustadt, and entered the Austrian army in 1859. While stationed in Italy he explored several groups of Alpine mountains. In 1870, with Weyprecht, he directed an Austrian polar expedition which penetrated the sea between Nova Zembla and Spitzenbergen. In 1872 Payer and Weyprecht discovered the archipelago which they called Franz Josef Land in honor of the emperor. In 1874 Payer resigned from the army and studied art. His most celebrated paintings are *The Bay of Death*, *The Death of Franklin*, *Abandoning the Ship*, and *Never to Return*. In 1876 he published an account of his researches. (See also POLAR REGIONS, Vol. XIX). W.M.C.

PAYN, JAMES, novelist; was born at Cheltenham, England, on February 28, 1830, and was educated at Eton, Woolwich and Cambridge. Immediately upon his graduation from the university in 1854, he began a most successful literary career. In 1858 he became editor of *Chambers's Journal*, and for years wrote exclusively for it. In 1882 he became editor of the *Cornhill Magazine*. He wrote more than a hundred volumes of fiction, including some of the most popular novels of the time. Among them may be named *Lost Sir Massingherd; By Proxy; The Luck of the Darrells; The Talk of the Town; Gwendolyn's Harvest*, etc. He also wrote *Some Literary Recollections* and *Gleams of Memory*, the last being an autobiography. He died in London on March 25, 1898. W.F.J.

PAYNE, HENRY B., legislator; born in Hamilton, N. Y., Nov. 30, 1810; was graduated at Hamilton College in 1832; admitted to the bar in Cleveland, O., in 1834; member of the state senate in 1849–50; several times a delegate from Ohio to national Democratic conventions; was elected to Congress in 1874, and to the United States Senate in 1884; member of Electoral Commission in 1876. He was a candidate for the Presidential nomination in 1880. He died in Cleveland, O., Sept. 9, 1896. G.J.H.

PAYNE, HENRY C., appointed Jan. 1902, U.S. postmaster-general in President Roosevelt's cabinet, was a well-known publicist in Milwaukee, Wis., recently receiver of the Northern Pacific R. R. Born at Ashfield, Mass., Nov. 23, 1843; he removed to Milwaukee in 1863. Died October 4, 1904.

PAYNE, JOHN, poet; born in London, England, Aug. 23, 1842; studied law and became a solicitor in 1867. His fame, however, rests on his literary work. His publications include *The Masque of Shadow; Intaglios; Songs of Life and Death; Lautrec; New Poems*, and *Francis Villon: A Biographical Study*. He also published translations of the *Poems of Francis Villon;* of the *Rubaiyat of Omar Khayyám*, and of the *Arabian Nights Entertainments*. Mr. Payne became noted for his proficiency in Oriental languages from which he has largely translated. G.J.H.

PAYNE, JOHN HOWARD, an American actor and dramatist, author of "Home, Sweet Home"; born in New York city, June 9, 1792. At the age of 15 he left his home in Easthampton, N.

Y., and spent several months in Boston. He then became a clerk in a New York counting house, meanwhile editing *The Thespian Mirror*. He studied for two years at Union College, and in 1809 made his first appearance on the stage as Young Norval at the Park Theatre, New York. In 1812 he went to England where he appeared at the Drury Lane Theatre, London, and made numerous provincial tours. While in London he wrote several dramas adapted from the French, among them *Clari, or the Maid of Milan*, in which appeared the song *Home, Sweet Home*. Payne knew intimately many English literary celebrities and corresponded with Coleridge and Lamb. In 1818 he brought out a successful tragedy, *Brutus*, in which he would have taken the title rôle but for the objections of his manager Kean, who became famous in the part. In 1826 he was the editor of *The Opera Glass*. He returned to New York in 1832 and from 1841 to 1845 he was United States Consul at Tunis, Africa. He returned there in 1851 and died there April 10, 1852. In 1883 his remains were removed to Washington, D. C., and interred in Oak Hill Cemetery, where a monument has since been erected. W.M.C.

PAYSON, a city of Utah County, central Utah, near the southern end of Utah Lake, on the Rio Grande Western and Union Pacific railroads, 66 miles S. of Salt Lake City. It is a trade center of a mining, agricultural and dairying region, and has manufactures of furniture. Population 1890, 2,135; 1900, 2,636.

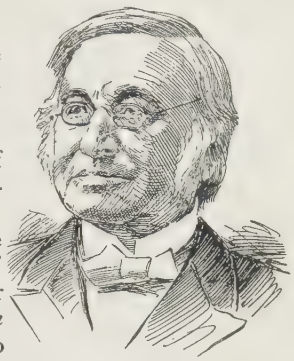
PAZAND MSS. See PAHLAVI, Vol. XVIII, p. 140.

PAZ-SOLDAN, PEDRO, a Peruvian poet; born in Lima in 1839. In 1850 he went to Europe to pursue literary studies at Madrid, Paris and Rome. After returning home in 1863 he served in various government offices at Lima, and was sometimes sent abroad in a diplomatic capacity. To the Peruvian journals he contributed many sketches of travels and manners. His *Poesias Peruanas* (1867) give graphic pictures of the people and scenery of Peru. His *Chispazos* is a little volume of sonnets and epigrams. He also published a *Diccionario de Peruanismos*, in which he illustrated the variations of Peruvian speech from pure Castilian.

PEABODY, a city of Marion County, southeastern central Kansas, 18 miles N.E. of Newton and about 50 miles S.W. of Emporia, on the Atchison, Topeka and Santa Fé and Chicago, Rock Island and Pacific railroads. It is in a rich agricultural and cattle-raising district, and the most important shipping-point in the state for corn-fed cattle and hogs; is the seat of the Kansas silk station; and has a foundry, windmill factory, creameries and flour-mills. Population 1890, 1,474; 1900, 1,369.

PEABODY, a town in Essex County, Massachusetts, on the Boston and Maine railroad. Population 1890, 10,158; 1900, 11,523. See PEABODY, Vol. XVIII, p. 452.

PEABODY, ANDREW PRESTON, an American clergyman and author; born in Beverly, Mass., March 19, 1811. He was graduated at Harvard College in 1828, finished his course of study at the Cambridge Divinity School in 1832, remained as tutor at Cambridge one year after, and was ordained pastor of the South Congregational Church in Portsmouth, N. H., in October, 1833. He was professor of Christian morals at Harvard from 1861 to 1881. In 1862 and 1868–69 he was acting president of Harvard. He was editor of the *North American Review* from 1852 to 1861, and was also editor of the *Christian Register* for several years. He wrote upward of 50 volumes, including *Lectures on Christian Doctrine* (1844); *Sermons of Consolation* (1847); *Conversation: Its Faults and Its Graces* (1856); *Christianity the Religion of Nature* (1864); *Reminiscences of European Travel* (1868); *Christian Belief and Life* (1875); *Harvard Graduates Whom I Have Known* (1890). As a critical Biblical scholar and acute reasoner, he stood in the front rank of the clergymen of letters of New England. He died in Cambridge, Mass., March 10, 1893. W.M.C.



REV. A. P. PEABODY.

PEABODY, ELIZABETH PALMER, an American educator; born in Billerica, Massachusetts, May 16, 1804; sister of Mrs. Nathaniel Hawthorne and Mrs. Horace Mann; taught in Bronson Alcott's school. She was one of the first to introduce into the United States the kindergarten system, and published a number of works, among which are *The Kindergarten in Italy* (1872); *Letters to Kindergartners* (1886); *Æsthetic Papers* (1849); *Chronological History of the United States* (1856); *Last Evening with Allston, and Other Papers* (1887); and edited Mrs. Mann's *Guide to the Kindergarten* (1877). She died in Jamaica Plain, Massachusetts, Jan. 3, 1894.

PEABODY, FRANCIS GREENWOOD, clergyman and educator; born in Boston in 1847; was graduated at Harvard University in 1869 and at its Divinity School in 1872. In 1880–86 he was Parkman professor of theology at the latter institution, and in the latter year became Plummer professor of Christian Morals at Harvard University. He is the author of *Short Addresses to Young Men on Personal Religion; Jesus Christ and the Social Question*, etc. G.J.H.

PEABODY EDUCATION FUND. In 1867, George Peabody (q.v., Vol. XVIII, p. 452) established a fund of $2,100,000, increased in 1869 to $3,384,000, to be devoted to education in the Southern states of the Union. The fund was placed under the control of 16 trustees. The general agent of the fund, with headquarters at Washington, District of Columbia, has charge of the distribution of the fund in the Southern states. In its earlier history, the chief aim of the fund was to encourage and secure the establishment of public school systems for the free education of all children. That having

been accomplished, the income of the fund is now used for the training of teachers through normal schools and teachers' institutes. Up to October, 1889, the fund had furnished $1,800,000 in aid of schools. For 1889–90 the fund stood $2,075,175 in good securities and $607,000 in "inactive" bonds.

PEACE PRESERVATION ACT. See HOME RULE, in these Supplements.

PEACE RIVER, a large river of Canada. It rises in two branches, in the Rocky Mountains, in northern British Columbia, and flows northeast to the outlet of Lake Athabasca, where it takes the name of Slave River, turns north and empties into Great Slave Lake by five widely separated mouths. The delta thus formed is, with that of the Athabasca River, the most fertile part of the country. The river has a length of about eight hundred miles, but it is much encumbered with rapids, although navigable by small steamers for some distance. The Peace River was followed by Sir A. Mackenzie in his expedition of 1792–93.

PEACH, a tree and its fruit; for a description of which, see PEACH, Vol. XVIII, pp. 453, 454. In the United States they cannot be raised profitably north of lat. 43° N. They reach their highest perfection in the middle states. Many peaches are dried, canned or made into brandy. The California product, famous the world over, is large, and of excellent quality. Those raised in Missouri, Ohio, Illinois, Michigan and in neighboring states are generally smaller than the Californian peach. According to the United States census report for 1890, there were, that year, 53 885,597 bearing trees in the whole country, from which 36,367,747 bushels of peaches were sold. Of this product, 5,525,119 bushels were raised in Georgia. The chief states besides Georgia were, in order, in amount of product, Texas, Arkansas, North Carolina, Tennessee, Alabama, Kansas, California, Missouri, South Carolina, Mississippi, Maryland and New Jersey. The last-named state sold 776,078 bushels.

PEACH CURL is a disease of peach trees causing the leaves to curl or become puckered early in the season. In most cases the leaves die and the fruit, deprived of nourishment, also falls. Spray the trees with Bordeaux mixture, viz., 2 pounds of copper sulphate, 2 pounds quick-lime and 20 gallons of water. W. R. B.

PEACH YELLOWS, the worst form of disease in peach trees. The cause of the disease is unknown and there is no known cure for it, save extermination of the tree, root and branch. It is communicable from tree to tree, in an orchard, but the means of communication is unknown. The symptoms of the disease are red spots on the fruit and stiff, yellowish, small leaves. W. R. B.

PEAK DISTRICT, England, a mountainous and forested region in the northwest angle of Derbyshire, which reaches a maximum altitude of 2,088 feet in Kinder Scout, frequently called "the Peak," 4 miles southeast of Glossop. The region of great scenic, historic, and romantic interest, is a noted tourist resort; the vales of Mattock, Dovedale, Millersdale, Castleton and Glossop, the banks of the Derwent, Dove and Wye, and the numerous limestone stalactitic caverns being notable. Peak Cavern or Devil's Hole near Castleton penetrates 2,250 feet into the mountain, 600 feet below its summit, and contains several chambers, one being 220 feet long, 210 feet wide, and 120 feet high. The ruins of Peveril Castle, built by the hero of Sir Walter Scott's novel, *Peveril of the Peak*, a natural son of William the Conqueror, still dominate a spur overlooking Castleton. C.L.S.

PEALE, CHARLES WILSON, artist; born in Chestertown, Md., April 16, 1741; studied painting at Annapolis, Md., under Hesselins, a German painter, and later at Boston. He went to London in 1770 and took lessons from Benjamin West. Returning to the United States he established himself in Philadelphia. During the Revolutionary War he showed his patriotism in various ways. When the militia of Philadelphia was called to active service he was appointed a lieutenant, and later was promoted captain. He commanded his company in the engagements of Trenton and Princeton. In 1779 he became a member of the Pennsylvania legislature, and there advocated the gradual emancipation of the slaves. Died in Philadelphia, Feb. 22, 1827. G.J.H.

PEALE, REMBRANDT, artist; born in Bucks County, Pa., Feb. 22, 1778, son of Charles Wilson Peale; studied under his father and later under Benjamin West in London. Returning to Philadelphia he entered on a career of notable success. About 1812 he removed to Baltimore, where he remained for nine years. While there he executed the famous painting *The Court of Death*. This was painted on a canvass measuring 24 by 13 feet. His portrait of Washington, which was of equal fame, was exhibited in London, Rome and Florence, and afterward was purchased by the United States government and hung in the Vice-President's room in the capitol at Washington. His other paintings include *Song of the Shirt; Wine and Cake; The Babes in the Woods; Italian Peasant; Errina*, and portraits of many famous men. He died in Philadelphia, Oct. 3, 1860. G.J.H.

PEANUT AND PEANUT-OIL. See GROUNDNUT, Vol. XI, p. 196.

PEAR. The fruit of the pear tree (*Pyrus communis*) tapers toward the stem, and is not sunk in a cavity at the base, as in the apple. It has not the firmness of the apple, but it is more sugary and melting. Near its core the pear has a hard concretion composed of indurated cells. The pear is an ancient fruit. At the present day more than 3,000 varieties of pears are enumerated in the catalogues, though only about twenty of these are in practical cultivation. Among the varieties widely cultivated for sale, the greatest favorite is the Bartlett, which is notable for its size, lusciousness and abundant bearing. Ninety per cent of the pears grown in the United States for sale are of this variety. Another smaller pear is the Seckel. This variety is traced to a single tree in the suburbs of Philadelphia. It is of unsurpassed flavor. As a rule, pears are better if picked when just mature, and then ripened in the house.

The pear has a wide range of distribution. It flourishes equally on the shores of the South Atlantic and on the highlands of the interior. Pear trees are most largely cultivated in New York and California. The latter state is best adapted to their culture, and produces pears in large quantities and of extraordinary sizes. Many California pears are shipped to the East, and still greater quantities are preserved by canning, for which they are excellently suited, since canning preserves much of their original flavor. According to the census report for 1890, there were, that year, 5,115,055 bearing trees in the United States, which produced 3,064,375 bushels. New York headed the list of states, with 588,767 bushels, followed by California, Ohio, Michigan, Indiana, and Pennsylvania. See also PEAR, Vol. XVIII, pp. 456, 457, and HORTICULTURE, Vol. XII, p. 284.

PEARCE, CHARLES SPRAGUE, an American artist; born in Boston, Mass., Oct. 13, 1851. He studied under Bonnat in Paris, and traveled extensively in Europe and Algiers. Among his works, in recognition of whose merit he received many honors, are *Death of the First-Born of Egypt* (1877); *Decapitation of John the Baptist* (1881); *Toilers of the Sea* (1884); *St. Genevieve* (1887); and *The Family*, a series of mural paintings in the Library of Congress.

PEA RIDGE, Arkansas, the scene of a battle fought March 6 to 8, 1862, in which the Confederates, under General Van Dorn, were defeated by the Union forces under General Curtis. The Union troops numbered about 10,000, while the Confederates had 20,000, inclusive of 6,000 Cherokee Indians. The engagement was begun by an advance on the part of the Confederates toward Sugar Creek, where the Union army was encamped. The Union left, under the immediate command of Sigel, was first attacked, but succeeded in repulsing the Confederates. The Union right, under Carr, was, however, driven back. A movement by Sigel placed the Confederates in a cross-fire and compelled them to retire. Both forces lost heavily.

PEARL–ASHES OR CARBONATE OF POTASH. See POTASSIUM, Vol. XIX, p. 606.

PEARL–FISHERIES. See PEARL, Vol. XVIII, pp. 457–459.

PEARL RIVER. See CANTON, Vol. V, p. 33.

PEARL RIVER, a river formed by the union of several small streams in Neshoba County, eastern central Mississippi; flows southwesterly to Jackson, where it begins a southerly course, in its southern part forming a part of the boundary between Mississippi and Louisiana. It empties into the Gulf of Mexico, east of Lake Pontchartrain, after flowing a distance of 400 miles, the distance being so great on account of the winding course. It is navigable for flatboats through a fertile cotton region as far as Jackson. The river is subject to overflows in the lower portions.

PEARL RIVERS, the pseudonym of NICHOLSON, MRS. ELIZA JANE; q.v., in these Supplements.

PEARL–SHELL FISHERIES. See MOTHER-OF-PEARL, Vol. XVII, p. 8.

PEARL–WHITE. See BISMUTH, Vol. III, p. 687.

PEARLYTE. See IRON AND STEEL, in these Supplements.

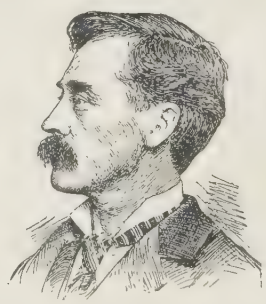
PEARSALL, a town and the capital of Frio County, southern Texas, 54 miles S.W. of San Antonio and about 100 miles N.N.E. of Laredo, on the International and Great Northern railroad. It is the trade center for a district devoted to grazing and farming. Population 1900, est'd, 800.

PEARSON, JOHN LOUGHBOROUGH, R. A., a British architect; born at Brussels, July 5, 1817, and died in England, Dec. 10, 1897. He studied architecture in Durham, and later established himself in London. His first work to attract attention was Holy Trinity Church, Westminster, erected in 1850. He designed the schools of St. Peter's, Vauxhall, in 1860; was elected a member of the principal British architects' societies, and made a knight of the Legion of Honor. In 1870 he became architect to Lincoln Cathedral, and eight years later began the great monument of his art—Truro Cathedral. He also restored the west side of Westminster Hall, and was architect for Westminster Abbey.

PEARSONS, DANIEL KIMBALL, philanthropist; born in Bradford, Vt., April 14, 1820; was graduated in medicine in Woodstock, Vt. He settled in Chicopee, Mass., where he practiced till 1857. He then removed to Ogle County, Ill., and there carried on farming for three years. In 1860 with $5,000 he established himself in the real estate business. During the first ten years of his business career he was engaged in selling farm lands, and in that time had disposed of over a million acres on which he received a five per cent. commission. The money thus acquired was invested in pine lands in Michigan from which he sold lumber at large profit. He retired from active business in 1887, with the exception of remaining a director in the Chicago City Railway Company and a few other corporations. During 1890–1900 he gave away $2,500,000, principally to the cause of college education in the West, South, and Southwest. It is estimated that his entire benefactions aggregate $4,000,000.

G.J.H.

PEARY, ROBERT EDWIN, an American Arctic explorer; born in Pennsylvania in 1854; removed with his parents to Maine; graduated at Bowdoin College; in 1885 was selected, by competition, as a civil engineer for the United States navy, with the rank and pay of lieutenant. In 1886, 1891 and 1893 he made expeditions to the polar regions, which are noted in the article, POLAR EXPLORATIONS, in these Supplements. From the last expedition he returned with the "Peary relief expedition," in the steamer *Kite*, to St. John's, Newfoundland, Sept. 21, 1895. The relief expedition was in charge of Emil Diebitsch, brother of Mrs. Josephine Peary, who accompanied her husband in his expeditions, and published an account of the first in *My Arctic Jour-*



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LIEUT. R. E. PEARY.

nal (1893). In May, 1896, Lieutenant Peary made a very successful expedition to Greenland for the purpose of collecting natural history specimens, returning to Sydney, Cape Breton, September 27th. His report of his reconnaissance of the Greenland ice in 1886, and his report on the North Greenland expedition are well known. In 1898 he published *Northward Over the Great Ice.*

PEARY EXPEDITION. See POLAR EXPLORATIONS, in these Supplements.

PEASANTS' WAR. See GERMANY, Vol. X, p. 447; and LUTHER, Vol. XV, p. 80.

PEAT. See FUEL, Vol. IX, pp. 709, 710; and GEOLOGY, Vol. X, pp. 212, 213.

PEA-WEEVIL. See WEEVILS, Vol. XXIX, p. 514.

PECAN (*Carya olivæformis*), a North American tree, being one of the hickories. It is a handsome, lofty tree, growing to the height of 70 feet, with a straight trunk and leaves of from 13 to 15 leaflets. It abounds on the rich bottom lands from Indiana and Illinois southward to Mississippi, and thrives especially in Arkansas and the Indian Territory. It is the largest of the hickory trees; but its wood is of little use except for fuel. The fruit of the pecan-tree is the most palatable of all the hickory nuts. It is sweet, of an agreeable flavor, and has a thin, easily-broken, yellowish-brown shell, without the internal partitions of the ordinary hickory-nut. The pecan is extensively raised for sale in the Southern states. See also HICKORY, Vol. XI, pp. 705, 706.

PECATONICA, a village of Winnebago County, northern Illinois, on Pecatonica River, and on the Chicago and North-Western Railroad, midway between Freeport and Rockford. It is in an agricultural and stock-raising district; is engaged in pork-packing, and has a large shoe factory. Population 1890, 1,059; 1900, 1,045.

PECCHIO, GIUSEPPE (1785–1835). See POLITICAL ECONOMY, Vol. XIX, p. 375.

PECH, HENRIETTA, or in Bohemian, JINDRISKA PECHOVA, a Bohemian poetess; pseudonym ELISKA KRASNOHORSKA. See SLAVS, Vol. XXII, p. 162.

PECHI-LI, GULF OF, a wide, shallow basin forming an arm of the Yellow Sea, surrounded on three sides by the provinces of Shan-tung, Pechi-li and Shing-king, in northeastern China. The Hwang-ho enters the gulf on its southwestern shore. With its northern extension, known as the Gulf of Liau-tung, the Gulf of Pechi-li has a length of about 290 miles. See CHINA, Vol. V, p. 550.

PECK, HARRY THURSTON, educator and man of letters; was born at Stamford, Connecticut, on November 24, 1856, was graduated from Columbia College, New York, in 1881, and also studied at Berlin. He became connected with the Columbia College faculty in 1882, and has for many years been professor of Latin there, as well as a lecturer in Barnard College, secretary of the faculty, etc. He was one of the organizers of the Columbia University Press. He has contributed much in poetry and prose to current literature, and has done much editorial work on dictionaries, encyclopædias, atlases, etc. Since 1895 he has edited *The Bookman* magazine. His published volumes include *The Personal Equation; The Semitic Theory of Creation; Latin Pronunciation; What Is Good English?* and *Greystone and Porphyry*, the last named being a volume of poems. He has also made many addresses on educational and other topics, which have been published. Some of his short poems in magazines have won much popularity. W.F.J.

PECK, JESSE TRUESDELL, an American clergyman and author; born in Middlefield, N. Y., Aug. 4, 1811. He was educated at the Cazenovia, N. Y., Seminary, and was licensed to preach in 1829. He was made a member of the Oneida Conference in 1832. From 1848 to 1852 he was president of Dickinson College. In 1856 he became pastor of the Greene Street Methodist Church, New York City, and in 1860 was transferred to California. In 1872 he returned to the East and was elected bishop. Among his works are *The Central Idea of Christianity* (1855); *The True Woman* (1857); *The History of the Great Republic* (1868). He died in Syracuse, N. Y., May 17, 1883. W.M.C.

PECK, JOHN MASON, clergyman; born in Litchfield, Conn., Oct. 31, 1789. He became a Baptist preacher at New Durham, N. Y., in 1811; was ordained in the ministry in 1813, and from 1822 to 1826 preached as a missionary in St. Louis and in parts of Missouri and Illinois. He established in 1826 a seminary at Rock Spring, Ill., for the instruction of theological students, which in 1835 developed into Shurtleff College, Upper Alton, Ill. In his efforts to endow this institution he traveled widely through the country, collecting $20,000. The *Western Pioneer and Baptist* was founded by him in 1828, the Illinois *Sunday School Banner* later, and from 1843 to 1845 he was the financial agent of the American Baptist Publication Society. He died in Rock Spring, Illinois, March 15, 1858. G.J.H.

PECOS, a town and the capital of Reeves County, western Texas, on the Pecos River, at the junction of the Pecos Valley with the Texas and Pacific Railroad, 135 miles W. of Big Springs. It is the trade center for an extensive district devoted to agriculture, and sheep and cattle raising. Population 1890, 393; 1900 (12th census), 639.

PECOS RIVER. See NEW MEXICO, Vol. XVII, pp. 410, 411; and IRRIGATION in these Supplements.

PECQUET, JEAN (1620–74). See HARVEY, Vol. XI, p. 451.

PECTIN AND PECTOSE. See JAMS and JELLIES, Vol. XIII, p. 573; and BOTANY, Vol. IV, p. 78.

PECTOSE AND PECTIC ACID. A ferment substance found in ripening plants, as in the carrot, the character of which is somewhat obscure. It acts upon the pectose of unripe fruits and vegetables and produces *pectin*, or plant-jelly. It is a semi-solid, and is not known to crystallize. Pectin, under alkaline reaction, give rise to two gelatinous acids, with these probable chemical formulas;

namely, *pectosic acid* ($C^{32}H^{40}F^{28}+3H^2O$) and *pectic acid* ($C^{16}H^{22}O^{15}$).

PEDAGOGICS. See EDUCATION, Vol. VII, pp. 687, 688.

PEDEE, the general name given to two rivers, distinguished as the Great Pedee and Little Pedee. The former rises in southern North Carolina, and is known as the Yadkin until it enters South Carolina, flowing in a southeasterly direction. Continuing in the same direction through South Carolina, it empties into Winyaw Bay, in Georgetown County. It is about 415 miles long, and is navigable for small vessels for about 200 miles. The principal tributaries of the Great Pedee are the Waccamaw and Little Pedee. The latter rises in North Carolina, flows southerly through Robeson County, in the latter state, forms the western boundary of Harry County, South Carolina, and joins the Great Pedee at the southern extremity of Marion County.

PEDERSEN, CHRISTIAN. See DENMARK, Vol. VII, p. 79.

PEDICULATI. See ICHTHYOLOGY, Vol. XII, p. 728.

PEDIGREES AND PEDIGREE-TRACING. See GENEALOGIES, AMERICAN, in these Supplements.

PEDIMENT. See ARCHITECTURE, Vol. II, p. 412.

PEDIPALPI, an order of arachnids, found in the warmer regions of the earth. They are often called scorpion-spiders or whip-scorpions. Their habits are not well known. There are two genera, *Phrynus* and *Thelyphonus*, the latter occurring within the United States.

PEDRARIAS OR DANILA. See BALBOA, Vol. III, p. 237.

PEDRO I (1798–1834). See BRAZIL, Vol. IV, pp. 208, 209.

PEDRO II, DE ALCANTERA, emperor of Brazil; born in Rio de Janeiro, Dec. 2, 1825. He was the only son of Emperor Pedro I. and of Leopoldina, archduchess of Austria. He succeeded to the throne on the abdication of his father, April 7, 1831. The affairs of the government were placed in the hands of regency until July 23, 1840, when Pedro was declared of age, and he then assumed sovereign power of the state. In 1843 he married the Princess Theresa Christina Maria, sister of Francis I., king of Naples She died in 1889. Brazil prospered greatly under the rule of Pedro II. He was an enlightened ruler and never sought to employ aggressively even the restricted powers which the constitution permitted him. He was very scholarly in his tastes. In 1862 a quarrel arose between Brazil and Great Britain, which was settled in Pedro's favor by arbitration, which did much to increase his power. During his reign several wars occurred with other nations. These include a war with the dictator Rosas of Buenos Ayres in 1851, with Uruguay in 1854 and 1864, and with Lopez of Paraguay in 1865. In 1871 and 1872 Dom Pedro made an extended tour of Great Britain and the Continent and in 1876 attended the Centennial Exposition in Philadelphia, being present and assisting at the opening ceremonies. In 1871 he issued an important decree abolishing slavery in Brazil. In 1889 Brazil became a republic and the emperor withdrew from the country, taking up his residence in France, where he remained until his death in Paris, December 5, 1891. (See also BRAZIL, Vol. IV, pp. 209, 210.) W.M.C.

DOM PEDRO II.

PEEKSKILL, a manufacturing village in Cortlandt township, Westchester County, southeastern New York, lies on the east bank of the Hudson, 43 miles above New York City, and on the New York Central and Hudson River railroad. The village has twelve churches, good public school, a military academy, St. Gabriel's (Protestant Episcopal), a boarding-school for young ladies, charitable institutions, a public library, banks, water-works and electric lights. A church dating from 1767, and the Van Cortlandt mansion, are among its principal buildings. The important industries are iron foundries, machine-shops, flour-mills, blank-book establishments, stove-works and cigar factories. Population 1890, 9,676; 1900, 10,358.

PEEL, ARTHUR WELLESLEY, VISCOUNT, statesman; born in England, Aug. 3, 1829, son of Sir Robert Peel, baronet; was educated at Eton and at Oxford University. He represented Warwick in Parliament in 1865–85, and Warwick and Leamington in 1885–95. He was Parliamentary secretary to the Poor Law Board in 1868–71, and to the Board of Trade in 1871–73; was Patronage Secretary to the Treasury in 1873–74; Under Secretary to the Home Office in 1880, and Speaker of the House of Commons in 1884–95. He was elected a trustee of the British Museum in 1898, and for a time was chairman of the National Portrait Gallery. G.J.H.

PEEPUL, PIPPUL OR BO, a tree. See FIG, Vol. IX, p. 135.

PEET, HARVEY PRINDLE, an American educator; born in Bethlehem, Conn., Nov. 19, 1794. From the age of 16 he was engaged in teaching school, meanwhile fitting himself for college at Phillips Andover Academy. He graduated at Yale in 1822, and became instructor and later steward at the deaf and dumb asylum at Hartford, Conn. In 1831 he was appointed principal of the deaf and dumb institution in New York, where he filled the offices of steward, teacher, chaplain, and secretary and managed the institution single-handed. He also prepared a series of elementary books for use in such schools, investigated the methods of instruction pursued in other countries, and wrote many works on the education of the deaf and dumb. He died in New York, Jan. 1, 1873. E.E.T.

PEEWIT. See GULL, Vol. XI, p. 243; and LAPWING, Vol. XIV, p. 308, note.

PEGMATITE. See GRANITE, Vol. XI, p. 44.

PEH-CHELE OR CHIH-LI, a province. See CHINA, Vol. V, p. 650.

PEHLEVI. See PAHLAVI, Vol. XVIII, pp. 139–140.

PEIHO, a river. See CHINA, Vol. V, p. 549.

PEINE FORTE ET DURE. See TORTURE, Vol. XXIII, p. 494.

PEIPUS, a Russian lake. See PSKOFF, Vol. XX, p. 40.

PEIXOTO, FLORIANO VIERIA, statesman; born in the province of Alagoas, Brazil, April 30, 1826; was educated at the military school in Rio de Janeiro in 1858–64. He was then appointed first lieutenant in the Third Artillery battery. Early in 1865 he accompanied this battery against a Paraguayan army which had invaded the province of Rio Grande do Sul. While in command of the Brazilian artillery he prevented the enemy from crossing the Uruguay River and the whole army of 8,000 men was forced to surrender. Peixoto, like many other officers, returned from the war against Paraguay imbued with republican ideas. When the revolution against the empire broke out in 1889 he was adjutant-general of the army. He retained this position under the republic till 1890 when he was appointed minister of war. A year later he succeeded Marshal Fonseca as president. He died June 29, 1895. G.J.H.

GEN. F. PEIXOTO.

PEKIN, a city and the capital of Tazewell County, northern central Illinois, on the left bank of the Illinois River, 160 miles S.W. of Chicago, 56 miles N. of Springfield, and 10 miles below Peoria. It is a prominent railroad center, being located on the Atchison, Topeka and Santa Fé, Chicago, Peoria and St. Louis, Cleveland, Cincinnati, Chicago and St. Louis, Peoria, Decatur and Evansville, Peoria and Pekin Union railroads, all of which have made large and costly improvements, including depots, warehouses, etc., and add greatly to the amount of business annually transacted there. The city has 9 churches, 2 national banks, 3 daily and 4 weekly papers, a courthouse and jail, a high school and electric lights. It also contains foundries and machine-shops, cigar manufactories, hominy-mills, saw-mills, sash, door and blind factories, carriage factories and farming implement manufactories, distilleries, rolling-mills, marble-works, lumber-yards and soda-water factories. Large invoices of highwines, grain, coal and other products are shipped to Pekin, thence to the South and Southwest by rail and river, and to other points in the United States. Population 1890. 6,347; 1900, 8,420.

PE LA. See WAX, Vol. XXIV, pp. 485, 486.

PELAGIANISM. See PELAGIUS, XVIII, 483.

PELARGONIC ACID AND ETHER. See ŒNANTHIC ACID, Vol. XVII, p. 752.

PELARGONIUM. See HORTICULTURE, Vol. XII, pp. 272, 273.

PELASGIANS. See GREECE, Vol. XI, p. 81; ITALY, Vol. XIII, p. 453.

PELECANIDÆ. See PELICAN, Vol. XVIII, 485.

PELEE, MT., ERUPTION OF. See ST. PIERRE, in these Supplements.

PELEUS. See ACHILLES, Vol. I, p. 89.

PELION, a lofty range of mountains in Thessaly in the district of Magnesia, Greece. Its sides were covered with forests of oak, chestnut, beech, elm, plane and pine. On its summit was a temple of Jupiter Actæus, whose worshipers went in procession once a year to the temple, covering themselves with thick skins on account of the severe cold. Near the summit Mount Pelion, Chiron, the wisest of all the centaurs, resided in a cave, where he stored the rare medicinal plants that grew thickly on the mountain's sides. From the timber grown on Mount Pelion was built the ship that went forth with its adventurers to search for the golden fleece. In Greek mythology, the giant sons of Aloeus (the son of Neptune and Canace) in their wars with the gods in their attempt to scale heaven are said to have essayed to pile Ossa and Olympus on Pelion, or Pelion and Ossa on Olympus. Mount Pelion, the highest peak of the range, is 5,310 feet high. The modern name of the range is Plessidi.

PELLA. See MACEDONIA, Vol. XV, p. 138.

PELLA, a city of Marion County, south central Iowa, 47 miles E.S.E. of Des Moines, on the Chicago, Rock Island and Pacific railroad. It is in an agricultural region and the center of a variety of manufacturing interests, among the important industries being stone-quarrying, grape-culture and the manufacture of flour and lime. Pella is the seat of Central University of Iowa (Baptist), a co-educational institution established in 1853. It had in 1902, 13 instructors, 235 students and a library of 6,000 volumes. Population 1890, 2,408; 1900, 2,623.

PELLITORY, the common name of species of *Parietaria*, a genus of weedy plants of the family *Urticaceæ*, or nettles. *P. Pennsylvanica* is the American representative of the genus, while *P. officinalis* of Europe has a certain medical reputation. *Anacyclus pyrethrum*, a plant of the eastern Mediterranean region, of the family *Compositæ*, is the ordinary pellitory of commerce, used in benumbing nerves.

PELOPONNESIAN WAR. See GREECE, Vol. XI, pp. 91, 92.

PELOPONNESUS. See GREECE, Vol. XI, pp. 74, 84, et seq.

PELOTAS, Brazil, a seaport town in the southern state of Rio Grande do Sul, at the mouth of Rio São Gonçalo, in the southwest corner of the Lagoa dos Patos. It is connected by the Brazilian railway system with the city of Rio Grande do Sul, 20 miles to the southeast, and with other

important centers, and is an attractive town with fine buildings and modern improvements. The entrance to the harbor from the Atlantic is obstructed by the bar of the Rio Grande across the entrance to the Lagoa dos Patos; large vessels are unable to enter and have to be loaded from boats. Preserved beef and animal products are largely exported. Population, 42,000. C.L.S.

PELS, ANDRIES, a dramatist. See HOLLAND, Vol. XII, p. 99.

PELVIS. See ANATOMY, Vol. I, pp. 668–*668.

PEMBERTON, JOHN CLIFFORD, military officer; born in Philadelphia, Pa., Aug. 10, 1814; was graduated at the United States Military Academy in 1837; commissioned first lieutenant March 19, 1842; promoted captain, Sept. 16, 1850; resigned April 29, 1861. During the war with Mexico he greatly distinguished himself in the actions of Monterey and Molino del Rey. At the outbreak of the Civil War he accepted the commission of a lieutenant-colonel in the Virginia State Militia; was promoted colonel, May 8, 1861, and brigadier-general, June 17, following. In February, 1862, he was placed in command of the department including Florida, Georgia and South Carolina, and had his headquarters at Jackson, Miss. He conducted the campaign around Vicksburg from May till the surrender of that city July 4, 1863. After the war he settled in Virginia. He died July 13, 1881. G.J.H.

PEMBINA, a city and the capital of Pembina County, northeastern North Dakota, on the Red River of the North, at the mouth of the Pembina River, about 70 miles below Winnipeg, Manitoba, with which it has steamboat communication, and on the Northern Pacific railroad. It is situated in a wheat-raising district, and is an important grain-shipping point. Population 1900, 929.

PEMBROKE, a village of Pembroke township, Washington County, southeastern Maine, 10 miles N.W. of Eastport, and 20 miles S.E. of Calais, on Passamaquoddy Bay. Its nearest railroad station is Calais, on the St. Croix and Penobscot railroad, but it has water communication with coast towns. It is the seat of an extensive iron and nail manufactory. Population of the township in 1890, 1,514; 1900, 1,652.

PEMBROKE, a village of Pembroke township, Merrimac County, southeastern central New Hampshire, on the Merrimac River, at the mouth of the Suncook River, five miles S.S.E. of Concord. It is the seat of an academy. The township contains the villages of East and West Pembroke, is intersected by the Boston and Maine railroad. Population 1890, 3,172; 1900, 3,183.

PEMBROKE, a town and the capital of Renfrew County, northeastern Ontario, Canada, on the right bank of the Ottawa River, 96 miles above Ottawa, and on the Canadian Pacific railroad. The town is the center of a rich lumber district, and is furnished with excellent water-power by the Indian River, which enters the Ottawa at this point. The industries of the town include saw, grist and flour mills, an axe factory and a foundry. Population 1891, 4,401; 1901, 5,156.

PEMBROKE, a Welsh borough. See Vol. XVIII, p. 493.

PEMMICAN, as made by the American Indians, consisted originally of buffalo-meat dried by the sun or wind, and then pounded into a paste and tightly pressed into cakes; sometimes the fruit of the juneberry (*Amelanchier ovata*) was added to improve the flavor. It could be kept for a very long time uninjured. That made for the Arctic voyagers consists chiefly of beef.

PEMPHIGUS. See SKIN DISEASES, Vol. XXII, p. 131.

PENALTY, a punishment annexed by law or judicial decision to a violation of law; usually a sum of money to be paid, as in the case of a fine. But the expression "death penalty" is also often used. The term is also used to describe a penalty provided by contract as a forfeit which an obligor agrees to pay if he shall fail to fulfill his part of the agreement. The most ordinary form of penalty is that named in a bond. In a common money bond the obligor often binds himself in absolute terms to pay the obligee a certain sum which is the "penalty"; but in a subsequent clause, called the condition, it is provided that if he shall pay another and smaller sum with interest at a specified time the entire obligation shall be void. A penalty thus inserted in a contract is a mere matter of form. Its legal effect was long established by equity; and this equitable doctrine has been fully accepted by courts of law. The party who fails to perform his agreement does not thereby forfeit the whole sum mentioned as the penalty, but is liable only for the amount of damages actually sustained by the other party, and upon payment of such damages, or the principal and interest of the debt if the instrument is a penal bond, he is discharged from all other obligation. Under certain circumstances, however, such a clause is treated as any other promise to pay and is binding according to its terms, so that the exact amount named in the contract can be recovered from the obligor. Thus, in a bail-bond, a bond conditioned upon the performance of an act and other similar bonds, the penalty is generally required to be paid in full upon a breach of the condition thereof. See also FINE, Vol. IX, p. 168.

PENANG. Same as PRINCE OF WALES ISLAND, Vol. XIX, pp. 760, 761.

PENDENTIVE. See ARCHITECTURE, Vol. II, p. 412.

PENDER, SIR JOHN, an English cable magnate; born in Dumbartonshire, Scotland, in 1816; educated at the high-school, Glasgow, where he was awarded a gold medal for drawing; entered the counting-room of a local factory, and in a few years was its general manager; accumulated a fortune in business in Glasgow, Manchester and London. When the Atlantic cable project was broached he was one of 345 who contributed $5,000 to the experiment, with which enterprise he was thenceforward identified. He occupied in Britain the same position that Cyrus W. Field did in the United States. When cable after cable had failed and the *Great Eastern* parted with her

cable in mid-ocean, John Pender stood almost alone in Britain in his faith in the eventual success of the project. He again interested others, and aided in forming the Anglo-American Company, with a capital of $3,000,000. He gave his personal guaranty to the Cable Construction and Maintenance Company, and the cable was laid, the old cable being recovered during the second undertaking. He developed the Mediterranean, Eastern (Indian and China), Australian, South African and direct African cables. He was a member of Parliament for Totness from 1862 to 1866, and for Wick from 1872 until his death. He received the Grand Cordon of the Order of the Medjidieh from the Sultan of Turkey; was a Knight Commander of the St. Saviour Order of Greece and of the Order of the Rose of Portugal, and a Grand Cross of the Order of St. Michael and St. George of Britain. He published *Statistics of the Trade of the United Kingdom with Foreign Countries from 1840* (1869). His eldest son, J. Pender, was elected Conservative member of Parliament for Northamptonshire, England, in 1895. Sir John died in London, July 7, 1896.

PENDER, William Dorsey, an American soldier; born in Edgecombe County, N. Car., Feb. 6, 1834. He was graduated from the United States Military Academy in 1854, and entered service on the Western frontier. He resigned in 1861 to enter the Confederate army. While leading a brigade in the battle of Gettysburg he was mortally wounded, and died at Staunton, Va., July 18, 1863. W.M.C.

PENDLETON, a township of Lancashire, England, with a station on the Lancashire and Yorkshire railway. It is a suburb of Manchester, and is 2½ miles W.N.W. of the town of that name; has collieries and manufactories of cotton and silk. Population 1901, est'd, 60,000.

PENDLETON, a town and the county seat of Umatilla County, Oregon, in the northeastern part of the state. It lies on the Umatilla River, and 25 miles from the Columbia, at the northwest of the Blue Mountains, and at the edge of the Umatilla Indian Reservation. It was founded in 1867, and is now reached by the Washington and Columbia River and the Union Pacific railroads, and is one of the most rapidly growing towns of the state. The river furnishes it with a fine water-power for its flour mills, paper mills and machine shops and other industries, and the region around the town is rich in agriculture and lumbering. Pendleton is the seat of several academies, and has most of the public institutions of a considerable city. Its population was 730 in 1880, 2,506 in 1890, and 4,406 in 1900, and is still rapidly growing. W.F.J.

PENDLETON, Edmund, an American public man; born in Caroline County, Va., Sept. 9, 1721. In 1741 he was licensed to preach. In 1751 he became a county justice, and in 1752 was a member of the House of Burgesses. He was county lieutenant and a member of the Colonial convention in 1774, and of the Continental Congress, 1774–75, being its president, and president of the committee of safety, in the latter year. In 1777 he was crippled for life by injuries resulting from a fall from his horse, and was elected speaker of the House of Burgesses and president of the court of chancery. In 1779 he became president of the court of appeals, a position he held till his death. He was president of the Virginia Constitutional Convention of 1787, and died in Richmond, Va., Oct. 23, 1803. E.E.T.

PENDLETON, George H., an American public man; born in Cincinnati, Ohio, July 25, 1825. He studied law, was admitted to the bar, and began practice in Cincinnati. He was a member of the Ohio Senate, 1854–55; Representative in Congress from Ohio from December 7, 1857, to March 3, 1865; Democratic candidate for Vice-President on the McClellan ticket in 1864; United States senator from March 18, 1879, to March 3, 1885; and minister to Germany, 1885. He died in Brussels, Belgium, Nov. 24, 1889. E.E.T.

GEORGE H. PENDLETON.

PENDULUM. See Clocks, Vol. VI, pp. 14–17.

PENELOPIDÆ or PENELOPINÆ. See Guan, Vol. XI, p. 206.

PENINSULAR WAR. See Wellington, Vol. XXIV, pp. 523, 524.

PENN, John, an American patriot and statesman, a signer of the Declaration of Independence; born in Caroline County, Va., May 17, 1741. He studied law and was admitted to the bar in 1762. In 1774 he removed to Greenville County, N. C., and in 1775 was elected to the Continental Congress, where he signed the Declaration of Independence. He was re-elected in 1777 and upon the invasion of Lord Cornwallis, was placed in charge of the affairs of the state with almost unlimited powers. In 1784 he was made receiver of taxes for North Carolina. He died in Sept., 1788, near Greenville, N. C. W.M.C.

PENN, John, an American colonial governor, grandson of William Penn; born in London, England, July 14, 1729. He was educated in the University at Geneva, removed to Philadelphia in 1753 and served in the colonial council until after Braddock's defeat, when he returned to England. In 1763 he came back as lieutenant-governor. His administration was much disturbed by the Indians, with whom he succeeded in forming the treaty of Fort Stanwix in 1768. He was called to England in 1771 but returned as governor during the early portion of the Revolutionary period. In 1775 his council was supplanted by the committee of safety. He was imprisoned in

1777, but was released after a few months; the family was allowed £130,000 by the legislature for lands transferred to the possession of the state. He died in Bucks County, Pa., Feb. 9, 1795.

W.M.C.

PENN, Richard, an American colonial governor, grandson of William Penn; born in England, 1735. He was educated at St. John's College, Cambridge, and in 1763 accompanied his brother, John Penn, to Pennsylvania. In 1764 he became a member of the Colonial Congress. In 1771, during his brother's absence in England, he acted as lieutenant-governor of the colony, and while in that office entertained Washington and the members of the Continental Congress at his residence. At the outbreak of the Revolution he sympathized with the colonists, and in 1775 went to England with a petition for various concessions. In 1784 he was elected to the British Parliament, retaining his seat until 1794, after which he retired to private life. He visited Philadelphia in 1796. He died in Richmond, Surrey, England, May 27, 1811. W.M.C.

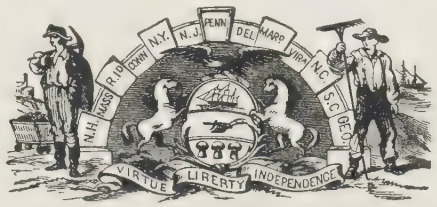
PENNELL, Henry Cholmondeley, author; born in London, in 1837; son of Sir Henry Pennell; received a private education and in 1853 entered the service of the British Government. In 1866–75 he was inspector of sea fisheries. In the latter year he was sent to Egypt by the British Government to initiate commercial and other reforms, and afterward was appointed director-general of interior commerce in that country. His publications include *Modern Babylon; Muses of Mayfair; Pegasus Re-saddled; From Grave to Gay; How to Spin for Pike; The Angler-Naturalist; The Book of the Pike; Fishing Gossip; Modern Practical Angler; Fly and Worm Fishing for Salmon, Trout and Grayling; Float Fishing; Trolling for Pike, Salmon and Trout; The Sporting Fish of Great Britain; Oyster Fisheries and Legislation; The Oyster and Mussel Fisheries of France*, etc. He also wrote numerous pamphlets and reports on sea fisheries, and edited the *Fisherman's Magazine and Review*. He is the owner of the Rossetti Mansions in Chelsea and the Palace Mansions in Kensington.

G.J.H.

PENNELL, Joseph, an American etcher and illustrator, born in Philadelphia, Pennsylvania, in 1860. He and his wife, Elizabeth Robins, as a result of their travels on the continent of Europe, illustrated and wrote a series of charming works. In 1887 appeared *Two Pilgrims' Progress*, by both, in France and Italy; which was followed by *Our Sentimental Journey Through France and Italy*, covering the route taken in Sterne's *Sentimental Journey* (1888); *Pen-Drawings and Pen-Draughtsmen*, in which the author vindicated the use of the pen in illustrative work (1889); *Our Journey to the Hebrides* (1889); *Charing Cross to St. Paul's*, the text by Justin McCarthy and the illustrations by Joseph Pennell (1891); *The Stream of Pleasure*, by himself and wife (1891); *Play in Provence*, by both (1892); *The Jew at Home*, in southeastern Europe (1892); *To Gypsysland*, by both (1893); *Modern Illustrations*, with examples in many different processes (1896) In 1891 he was arrested in Russian Poland while photographing scenery, being suspected of securing pictures of forts. He wrote an introduction (in which he assailed Raphael) to Dante Vierge's illustrations of Q. Villega's *Pablo de Segovia* (1892); and in 1894 an exhibition of his drawings was made at Keppel's gallery in New York.

JOSEPH PENNELL.

PENNSYLVANIA had a population in 1900 of 6,302,115, that of 1890 having been 5,258,014.



STATE SEAL OF PENNSYLVANIA.

The gain for the ten years amounted to 19.9 per cent, a falling off from the increase between 1880 and 1890, which was 22.8 per cent. In 1900, the density of population to the square mile was 140.1, an increase from 116.9 in 1890. The twelfth census report placed 25 of the cities of Pennsylvania in the list of places having a population of 15,000 or more, in which resided 2,570,667 of the people of the state, constituting 46.93 per cent of the entire number of inhabitants. The number of males was 3,204,541; of females, 3,097,574; the percentage of native-born population was 84.4; the number of negroes was 156,845, an increase of 49,249 within the ten years preceding; the Chinese numbered 1,927, the Japanese 40, and the civilized Indians 1,639.

The latest surveys of the state show the gross area to be 45,215 square miles, of which 230 square miles are water surface.

The census reports of 1900 show Pennsylvania standing high among the states in the area devoted to the cereals and in production. Of the entire acreage under the six crops classed as cereals, 31.2 per cent was under corn, 32.0 under wheat, 24.8 under oats, 0.2 under barley, 6.5 under rye, and 5.3 under buckwheat.

This table shows the area devoted to each crop:

Item.	Acres.	Bushels.
All cereals	4,738,194	117,810,178
Corn	1,480,833	51,869,780
Wheat	1,514,043	20,632,680
Oats	1,173,847	37,242,810
Barley	9,583	197,178
Rye	310,048	3,944,750
Buckwheat	249,840	3,922,980

Stock-raising has long been an important branch of agriculture in Pennsylvania. The number of colts foaled in 1889 was 59,532. In

1900 the mules in the state numbered 38,635, constituting 68.09 per cent of the entire number in the North Atlantic division. More than one-half of the swine on farms at the time of the enumeration were slaughtered for home use. The work-oxen on farms were materially increased between 1890 and 1900, and the gain in the number of milch cows during the same period amounted to 16,518. Other cattle on farms were increased in the same time by 173,910. Pennsylvania stood ninth in the average value of flax products per acre, but 16th among the 28 states reporting a production of either fiber or seed or both. The standing in the area devoted to tobacco was that of 6th, the acreage being 27,760; the production of 41,502,620 pounds giving the same position, that of 6th. The leading tobacco-producing county of the entire United States was Lancaster County, Pennsylvania, which in 1889 yielded 19,217,800lbs., in 1900 28,246,160 lbs.

Every state of the nine composing the North Atlantic division suffered a loss of number of farms during the decade 1880 to 1890. In Pennsylvania this decrease was almost two thousand, while the loss of the group exceeded 37,000.

The following table gives the relative sizes of the farms in Pennsylvania in 1900, as well as information in regard to the tenure under which they were held:

Total number of farms	224,248
Under 10 acres	17,156
10 and under 20 acres	17,882
20 and under 50 acres	41,575
50 and under 100 acres	69,670
100 and under 500 acres	77,039
500 and under 1,000 acres	688
1,000 acres and over	238
Cultivated by owners	153,031
Rented for fixed money value	23,737
Rented for share of products	34,529

At each decennial census since the eighth, Pennsylvania has held the rank of second among the states in the gross value of manufactured products, net value of the same, average number of employees, and the total wages paid. The census of 1900 gave the number of establishments at 52,185, the aggregate capital invested $1,551,548,712, the number of employees 781,273, the cost of material $1,042,434,599, and the value of the finished products $1,834,790,860. The following table gives the products whose value was above, or near to, twenty millions:

Industry.	Number.	Capital.	Workers.	Wages.	Product.
Boots and shoes	146	$ 6,860,480	9,144	$ 3,111,113	$ 13,235,933
Carpets and rugs	93	17,957,607	12,919	5,330,643	23,113,058
Clothing, men's factory product	481	10,446,107	10,497	4,422,074	23,389,043
Flouring and grist-mill products	2,719	19,516,993	2,195	1,061,869	36,639,423
Foundry and machine-shop products	1,268	154,958,750	62,828	33,199,521	127,292,440
Iron and steel	291	309,729,222	110,864	61,908,405	434,445,200
Leather, tanned, curried, etc	254	57,320,227	13,396	5,457,518	55,615,009
Lumber and timber	2,338	47,832,548	13,510	5,550,163	35,749,965
Petroleum, refining	38	26,580,504	3,299	1,681,603	34,977,706
Silk and silk goods	121	20,894,023	21,028	4,629,626	31,072,926
Sugar and molasses, refining	7	23,992,552	1,249	647,592	36,163,817
Woolen goods	193	19,405,505	13,721	5,091,932	25,389,344

The following statistics are from the census report of 1900:

Item.	1890.	1900.
Total number of farms	211,557	224,248
Average size of farms, acres	87	86.4
Total acres in farms	18,364,370	19,371,015
Improved acres in farms	13,210,597	13,209,183
Unimproved acres in farms	5,153,773	6,161,832
Valuation of land, fences, buildings, implements and machinery and live-stock	$1,062,939,846	$1,051,629,173
Estimated value of farm products	$121,328,348	$207,895,600
Number of horses	618,660	590,981
Number of mules and asses	29,563	38,635
Total number of neat cattle	1,706,418	1,896,847
Total number of swine	1,278,029	1,107,981
Total number of sheep	1,612,107	959,483
Pounds of wool sheared	6,441,164	6,732,226
Pounds of maple-sugar	1,651,163	1,429,540
Gallons of maple-syrup	.....	160,297
Gallons of sorghum-syrup	5,051,553	6,514
Acres of meadow-land mown for hay	3,323,689	3,269,441
Tons of hay produced	4,331,582	4,020,388
Acres under tobacco	26,955	27,760
Pounds of tobacco raised	28,956,247	41,502,620
Acres under Irish potatoes	191,992	227,867
Bushels of Irish potatoes raised	12,899,315	21,767,472

In addition to the above, the manufacture of tobacco in its different forms aggregated $33,335,932, printing and publishing $36,455,629; cotton goods, $25,447,697; worsted goods, $22,109,392; hosiery and knit goods, $21,896,063; liquors, malt, $29,162,743; and glass $22,011,130.

Pennsylvania stands at the head of all of the states in the value of mineral products, the census reports giving the production of 1889 at $150,876,649. The next three states in order of production, Michigan, Colorado and Montana, do not reach this amount with the combined value of their mineral products, which aggregate but $145,744,909. This value of mineral products embraces only raw material, manufactured articles not included. None of the precious metals are mined, the chief products being iron and its products, coal, petroleum, natural gas, and stone. The number of coal mines reported was 3,474, the number of tons produced 36,174,089 and the value of the same $27,953,315. The coal-fields of Pennsylvania are divided for state supervisory purposes into eight anthracite districts, embracing some ten different counties, and ten bituminous districts, which cover about thirty counties. The following table shows the production of coal and coke, and facts connected therewith·

Item.	1893.	1894.	1895.
Tons of anthracite	47,179,563	45,506,179	50,847,104
Employees, anthracite region	138,021	139,695	143,605
Tons of bituminous	43,421,898	39,800,210	51,813,112
Employees, bituminous region	81,800	86,177	84,904
Tons of coke	5,549,296	5,729,244	8,922,329

Of the anthracite-producing counties, Luzerne heads the list with 19,143,101 tons; in bituminous, Westmoreland leads with 10,325,245 tons. Among the employees of the coal-mines in 1895 there were 155 fatal accidents and 419 non-fatal. More than one hundred of the fatal accidents were caused by the falling of coal, roof, rock and slate. The ratio of fatal accidents to the number of workmen was 1 to each 544, and of non-fatal accidents 1 to every 202. The amount invested in iron-ore mining in 1889 was $16,249,313; the number of employees, 4,410; the total wages paid amounted to $1,141,239, all expenditures to $1,711,129, and the value of the output of the mines, $3,063,534. As to the value of the manufactured products of iron ore, see the table of manufactures, in this article. In the matter of petroleum the statistics of Pennsylvania are combined with those of New York in the census of 1890. The amount produced was 21,487,435 barrels of the crude oil, of the value of $23,475,163, as against $26,963,340, the total value of the product of the United States for the year. Of illuminating oil 21,393,159 barrels were produced, of the value of $23,225,453, as against $24,569,190, the value of the product made in the United States during the year. Lubricating and fuel oil combined yielded a return of about $2,395,000. Of the $11,044,858 worth of natural gas consumed during the year mentioned, through the states, Pennsylvania furnished the same to the amount of $8,287,383. The investment in the business represented a capital of $34,398,832, and of the total wages paid in all sections producing gas, amounting to $1,736,389, Pennsylvania paid $1,092,709. First in the production of stone of all kinds, Pennsylvania reported 776 quarries and a total output of $7,319,199. The products included granite, slate, limestone, sandstone, bluestone, millstones, graphite, soapstone, ocher and metallic paint.

The value of the fisheries of Pennsylvania in 1889 was $903,095; 2,631 persons were employed, as against 552 ten years previous, and 154 vessels and 1,046 boats were used in prosecuting the industry. The main branch of business was that of the oyster fishery, which produced about one half of the entire receipts. From 1890 a great interest came to be taken in the matter of inland fisheries, and large amounts of money were expended in stocking the waters of the state with the kinds of fish best adapted to the localities. Strict legal protection was thrown around the millions of young fish placed in the streams and lakes, and the benefits to the people became very apparent by 1895, when almost every portion of the state had fish in abundance.

The real estate of Pennsylvania was assessed for taxation in 1900 at $3,069,371,624. In 1900,

THE CAPITOL BUILDING, HARRISBURG.

the revenue commissioners fixed the value of the personal property of the state at $725,165,000. This, with other taxable interests would make the total assessable property amount to $3,831,127,517. The state receipts for the year ending Nov. 30, 1901, were $23,125,503, the balance on hand at the beginning of the fiscal year $5,081,325, making the total amount in the treasury during the year $26,111,355. Among the chief sources of revenue were tax on capital stock, amounting to $3,537,840; tax on personal property, $2,307,936; tax on collateral inheritances, $1,091,993; tax on corporation loans, $822,381; tax on gross receipts of corporations, $598,548; tax on bank stocks, $514,074; tax on foreign insurance companies, $513,616; mercantile licenses, $532,294; wholesale liquor licenses, $446,136; bonus on charters, $241,789; fees of public officers, $172,642. The payments for the year amounted to $12,684,871, leaving the balance on hand Dec. 1, 1901, $3,429,654. The public debt amounted at the time mentioned to the sum of $6,816,309, but the assets of the sinking-fund were sufficient to have reduced in 1901 this amount to $800,000. The biennial appropriations for 1901–02 amounted to $13,999,944 for the former year and $12,948,812 for the latter.

The following table shows the purposes for which the different appropriations were made, for the years mentioned, and the amount of the same:

	1896.	1895.
Educational	$ 6,879,081	$ 6,911,015
Charitable institutions	827,400	871,373
Care and treatment of indigent insane and for buildings	559,500	667,181
Penitentiaries and reformatories	322,127	367,127
Departments	537,450	558,041
Judiciary	667,300	667,300
Legislature	15,370	601,871
Interest on public debt	269,371	269,371
Public printing and binding	215,645	256,711
National Guard	350,000	350,000
Miscellaneous	305,568	449,953
Totals	$10,948,812	$11,969,943

The following table shows statistics regarding the state charitable, correctional and penal institutions of Pennsylvania:

Institutions.	Maintenance.	Inmates.
Hospitals for Insane.		
State Hospital, Harrisburg	$100,437	845
State Hospital, Danville	75,454	1,014
State Hospital, Norristown	164,240	1,813
State Hospital, Warren	76,277	908
Insane Hospital, Dixmont	48,101	743
Friends Asylum, Philadelphia	---- (a)	130
Pennsylvania Hospital, Philadelphia	---- (a)	418
State Asylum, Wernersville	128,251	764
Deaf and Dumb Institutions.		
Pennsylvania Institution, Phila.	138,339	502
W. Penn'a Institution, Allegheny Co.	42,631	195
Home for Young Deaf Children, Bala	19,576	43
Pennsylvania Oral School, Scranton	29,928	60
Blind Asylums.		
Pennsylvania Institution, Phila.	27,868	185
W. Penn'a Institution, Pittsburg	14,694	77
Institution for Feeble-Minded Children, Elwyn	96,250	982
State Penitentiary, Philadelphia	50,003	1,380
State Penitentiary, Allegheny	121,530	1,151
Indust'l Reformatory, Huntingdon	130,757	489
House of Refuge, Philadelphia	63,750	410
Reform School, Morganza	43,393	304

In addition to the foregoing, the state extended partial support to 103 hospitals, asylums, homes, societies and missions. The total expenditures for 1895 for charitable, correctional and penal institutions by the state was considerably in excess of $2,000,000. This amount did not include any part of the sums expended by counties for the care of paupers and prison expenses.

In 1900 there were operated within Pennsylvania 10,400 miles of railroad, an increase of about 277 miles over 1899, and 660 miles more than in 1893; the number of employees was given as 193,161, their total yearly compensation $102,959,434. Up to 1896 the actual cost of road and equipment of the different lines aggregated $1,579,857,035, and the total amount of funded debt and current liabilities aggregated $1,086,192,221. The report of all earnings and income showed the amount to be $277,454,035, the operating expenses and other expenditures reaching the sum of $250,094,248. In the report of the secretary of internal affairs is also included a statement relative to the street-railways of the state, the number of which in 1895 was 489, as compared with 60 lines in 1888. The canals of the state reported a mileage of 601, the cost of construction and fixtures amounting to $31,454,892. Almost one thousand boats ply the waters of the canals of the state, which carried in 1895 2,056,232 tons of freight, received the sum of $2,321,344, and expended for maintenance and operation $787,649. The different lines of telegraph and telephone in Pennsylvania reported a total of 13,643,704 messages sent during 1895, for which service they had received the sum of $2,238,684, and met gross expenses to the amount of $1,103,562.

But once during a period of fifty years has the legislature of Pennsylvania appropriated for the maintenance of the public schools a less sum than the amount appropriated by the preceding legislature. From the sum of $200,000 to $5,500,000 the appropriation has gradually kept pace with the demands of increase in population and educational methods. In addition to the $5,500,000 appropriated to the public schools for the year ending June 3, 1895, the legislature also aided the state college to the amount of $212,000, the post-graduate department of the University of Pennsylvania $200,000, and gave $50,000 to aid in establishing a school of mining in connection with the Western University. The following report of the public schools of Pennsylvania for the fiscal year (June 30, 1901) also includes the schools of the city of Philadelphia: Number of school districts in the state, 2,516, an increase of 31 within the year; number of schools, 29,046, an increase of 807; number of graded schools, 16,625, an increase of 1,041; number of male teachers, 9,194; number of female teachers, 20,850—an increase of 164 males and an decrease of 317 females; average salary of male teachers per month, $44.14, an increase of $0.36; average salary of female teachers, $38.23, an increase of $5.29; average length of school term in months, 7.91, a very slight decrease. The total number of pupils was 1,161,524, an increase of 29,933; the average number of pupils was 847,445. The cost of schoolhouses, purchasing, building, renting, etc., for the year, amounted to $3,724,558. The item of teachers' wages reached $11,355,334; cost of school text-books was $766,987; fuel, contingencies, etc., amounted to near $5,700,000, and the total expenditures footed $22,813,395. The estimated value of the school property of the state was $50,000,000. In 1895 the legislature passed a bill providing for compulsory education, by the terms of which all children within the state between the ages of eight and thirteen years were compelled to attend school, the minimum limit being twelve weeks, of which six weeks must be consecutive. To provide for the enforcement of this law, districts were to be deprived of a pro rata amount of the school revenue for each child not attending in accordance with law. In the 13 districts of the state in which normal schools are maintained, the legislature appropriated $118,467. Since the organization of these schools the state has, by direct legislative appropriation, donated to the 13 the aggregate sum of $2,534,991. Among the institutions of higher education in Pennsylvania were 5 universities, 32 colleges, 14 seminaries, 16 academies, 8 institutes, 20 schools and 3 homes, in which 1,293 instructors were employed, and which had a total enrollment of 19,855. The whole number of students in these institutions since their foundation amounted to 157,439, but in this report many did not join. At the last commencement exercises of the several institutions the number of female graduates was 732; the number of male graduates, 1,499.

The following is a list of the denominational educational institutions of Pennsylvania, their location, and the church organization under whose auspices they were managed (1896):

Location.	Institutions.	Religious Denomination.
Allentown	Muhlenberg College	Lutheran.
Annville	Lebanon Valley Coll	U. Brethren.
Beatty	St. Vincent College	Roman Cath.
Beaver Falls	Geneva College	Ref. Pres.
Bethlehem	Moravian College	U. Brethren.
Carlisle	Dickinson College	Meth. Epis.
Collegeville	Ursinus College	Reformed.
Easton	Lafayette College	Presbyterian.
Gettysburg	Pennsylvania College	Lutheran.
Greenville	Thiel College	Lutheran.
Haverford	Haverford College	Friends.
Jefferson	Monongahela College	Baptist.
Lancaster	Franklin and Marshall College	Reformed.
Lewisburg	Bucknell University	Baptist.
Lincoln Univers'y.	Lincoln University	Presbyterian.
Meadville	Allegheny College	Meth. Epis.
New Berlin	Central Pennsylvania College	Evan. Ass'n.
New Wilmington	Westminster College	United Pres.
Philadelphia	La Salle College	Roman Cath.
Pittsburg	Holy Ghost College	Roman Cath.
Swathmore	Swathmore College	Friends.
Villanova	Villanova College	Roman Cath.
Washington	Washington and Jefferson College	Presbyterian.

The following is a list of the nonsectarian institutions of the state:

Location.	Institutions.
Allegheny	Western University of Pennsylvania.
Chester	Pennsylvania Military College.
Grove City	Grove City College.
Philadelphia	Central High School.
Philadelphia	University of Pennsylvania.
Pittsburg	Duquesne College.
Volant	Volant College.

The following are the educational institutions for women in Pennsylvania, their location, and the auspices under which they are controlled:

Location.	Institutions.	Management.
Allentown	Allentown College for Women	Reformed.
Bethlehem	Moravian Seminary for Young Ladies	Moravian.
Carlisle	Metzger College	Non-sect.
Chambersburg	Wilson College	Presbyterian.
Lititz	Linden Hall Seminary	Moravian.
Mechanicsburg	Irving College for Young Women	Lutheran.
Ogontz School	Ogontz School	Non-sect.
Pittsburg	Penn'a Coll. for Women.	Presbyterian.
Pittsburg	Pittsburg Female Coll.	Meth. Epis.

In 1890 there were 10,175 church organizations in Pennsylvania, 9,624 edifices, a membership of 1,726,640, which constituted 32.84 per cent of the entire population, and church property of the value of $85,917,370. In the number of organizations and edifices Pennsylvania ranks first among the states and is second in the number of communicants and the value of church property. Fifty-two denominations and 17 independent congregations were enumerated. All Baptist bodies numbered 720; the Roman Catholics, 654; the Church of God, 162; Congregationalists, 108; Disciples of Christ, 125; Dunkards, 134; Evangelical Association, 662; Friends, 108; Lutherans, all bodies, 1,292; Methodists, all bodies, 2,536; Presbyterians, 1,365; Protestant Episcopal, 382; Reformed, 762; and United Brethren, 526.

Pennsylvania stands first among the states in the number of church organizations, first in the number of edifices and first in the approximate seating capacity of the church buildings. In the value of church property Pennsylvania stands second only to New York and occupies the same relative position as to the number of communicants or members.

The National Guard of Pennsylvania, according to the report of the adjutant-general of the state made at the close of 1895, numbered 8,934 officers and enlisted men. The force consisted of 1 division, divided into 3 brigades, and comprising 140 companies divided into 15 regiments of infantry (3 of 10 companies and 12 of 8 companies each), 1 battalion of infantry of 4 companies, 1 independent company of infantry, 3 batteries of artillery, 3 troops of cavalry and 3 divisions of naval militia (each division being equivalent to a company of infantry.) The expenditures made in 1895 on state account amounted to $339,719, to which the United States added $41,533, mainly in equipments and accouterments.

Jan. 1, 1899, there were 1,461 newspapers published in Pennsylvania, of which 197 were daily, 8 triweekly, 39 semiweekly, 941 weekly, 7 fortnightly, 17 semimonthly, 225 monthly, 1 every six weeks, 8 bimonthly, and 18 quarterly. Papers were published in all of the 67 counties, and in 460 of the cities, towns, and villages, of which 67 were county seats.

Of the date of Nov. 30, 1900, the commissioner of banking reported as follows:

Institution.	No.	Capital.	Surplus.	Deposits.
Banks	101	$ 8,774,380	$ 6,517,978	$ 79,031,082
Savi'gs instit's	17	110,200	7,758,754	107,621,381
Trust Co's	111	41,682,615	21,932,994	168,824,969
Total	229	$50,567,195	$36,209,726	$355,477,432

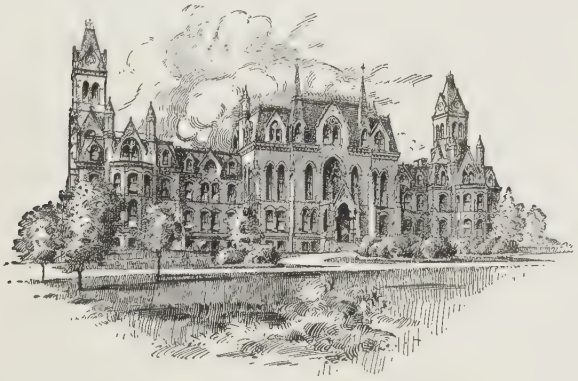
The following is a list of the principal cities and towns of Pennsylvania, with the population as given in the census reports of 1900: Philadelphia, 1,293,697; Pittsburg, 321,616; Allegheny, 129,896; Scranton, 102,026; Reading, 78,961; Erie, 52,733; Harrisburg, 50,167; Wilkesbarre, 51,721; Lancaster, 41,459; Altoona, 38,973; Williamsport, 28,757; Allentown, 35,416; Johnstown, 35,936; York, 33,708; McKeesport, 34,227; Chester, 33,988; Norristown, 22,265; Shenandoah, 20,321; Lebanon, 17,628; Easton, 25,238; Shamokin, 18,202; Pottsville, 15,710; Pottstown, 13,696; Hazelton, 14,230; Newcastle, 28,339; Mahanoy, City, 13,504; Oil City, 13,264.

The following is a list of the governors of Pennsylvania, with their respective terms of office: Thomas Mifflin, 1788–99; Thomas McKean, 1799–1808; Simon Snyder, 1808–17; William Findley, 1817–20; Joseph Heister, 1820–23; J. Andrew Schulze, 1823–29; George Wolf, 1820–

37; Joseph Ritner, 1837–39; David R. Porter, 1839–45, Francis R. Shunk, 1845–49; William F. Johnston, 1849–52; William Bigler, 1852–55; James Pollock, 1855–58; William F. Packer, 1858–61; Andrew G. Curtin, 1861–67; John W. Geary, 1867–73; John F. Hartranft, 1873–79; Henry M. Hoyt, 1879–83; Robt. E. Pattison, 1883–87; Jas. A. Beaver, 1887–91; R. E. Pattison, 1891–95; D. H. Hastings, 1895–99; Wm. A. Stone, 1899–03; S. W. Pennypacker, 1903–.

See PENNSYLVANIA, Vol. XVIII, pp. 509–515.

PENNSYLVANIA, UNIVERSITY OF. This institution owes its existence to the efforts of Ben-



COLLEGE HALL, UNIVERSITY OF PENNSYLVANIA.

jamin Franklin, who organized a board of trustees in 1749, and who, after obtaining $2,000 by subscriptions, was elected a trustee of a building in Philadelphia, on Fourth Street, near Arch. Instruction began in 1751, and in 1753 the institution was incorporated as "The Trustees of the Academy and Charitable School in the Province of Pennsylvania." Under a second charter, obtained in 1755, under the style of "The College and Academy of Philadelphia," the first class was graduated in 1757. In 1762 William Smith, the provost of the college, added £6,000 to the endowment, which sum he obtained in England. With this and an added sum, obtained by means of a lottery, another building was especially prepared for the accommodation of students from the West Indies. The medical school was opened in 1765. Upon the outbreak of the Revolution Dr. Smith, who was regarded as a friend to Great Britain, was imprisoned; but he continued to hear recitations from his cell. The charter of the college was revoked by the legislature in 1779, and its franchises were conferred upon a new organization, "The University of the State of Pennsylvania"; but ten years later the old faculty and trustees of the College of Philadelphia were reinstated, and in 1791 the sundered interests of the two corporations were compromised by their uniting under the style of the "University of Pennsylvania."

In 1828 the university acquired title to the property where now stands the Philadelphia post-office, and added two new buildings for departments in law, medicine and the arts, where its work was carried on until 1872, when the institution entered on a new career. In 1896 the university plant embraced nearly fifty acres of land, together with a half-dozen buildings, the main structure, a beautiful half-Gothic, having a frontage of 260 feet and overlooking the Schuylkill River; also a library building containing 200,000 volumes and a fine collection of antique and historical engraved gems gathered by Maxwell Sommerville, professor of glyptography, and valued at $200,000; also a medical hall, a hospital, a laboratory building, a veterinary college, and a biological hall. The entire plant was valued at $3,500,000. In 1904, the total productive funds were $4,360,347. In 1904, there were 316 instructors and 2,692 students; and the total income was $1,210,728. An expedition to Babylonia, sent out by this university in 1889, discovered (1895–96) the ancient city of Nippur, which is alleged to antedate Babylon by thousands of years. See NIPPUR, in these Supplements.

PENNSYLVANIA COLLEGE, an educational institution for the instruction of both sexes,

RECITATION HALL, PENNSYLVANIA COLLEGE.

located at Gettysburg, Pa., where it was founded in 1832 under the direction of the Lutheran Church. At its start it was without endowment, but in 1834 an appropriation of $18,000 was granted by the legislature of Pennsylvania for its support, with an additional grant of $1,000 annually to continue for a specified number of years. Also, by an act of the legislature in 1850 one-third of the funds of Franklin College at Lancaster, Pa., were granted to Pennsylvania College for the purpose of enabling it to found a Franklin professorship. The productive funds of the college amount to $200,000, and its annual income to about $26,000. It has departments of German and English languages and literature, natural science, hygiene and physical culture, and the English Bible, and possesses chemical and philosophical apparatus, a laboratory of practical chemistry, a cabinet of mineralogy, and an observatory for astronomical research. G.J.H.

PENNSYLVANIA DUTCH, a name in common use for the descendants of the German religious sects that settled in Pennsylvania early in the eighteenth century, chiefly between the Susquehanna and

Schuylkill rivers. They form the body of the Dunkers, of the various branches of the Mennonites, and of kindred exclusive sects. Their professed withdrawal from the world has led to their living in secluded communities, and even where they are mingled parts of a diversified and American population they go in and out with little attention to general interests. They maintain their modes of distinctive dress; they intermarry among themselves; they are wealthy, for an agricultural community; their farms are in superb tilth, and are notable for their great barns standing picturesquely on the summit of some gentle slope, and for their tiny, plain brick houses. Among them are many persons who do not understand English at all, and who communicate with each other only in the tongue called "Pennsylvania Dutch." The original immigrants came from the Palatinate, Bavaria, German Switzerland, and even from Alsace. They spoke the provincial German characteristic of those localities, and the speech of their descendants has arisen from the mingling of those related dialects, influenced in some measure by the incorporation of useful English words and the natural modifications that take place in oral language. This speech has been investigated by S. S. Haldeman and Henry Harbaugh, whose publications have made its study practicable for the curious. It seems to be related to the Pfälzisch, and preserves many old German words used by the peasantry in the home countries, interspersed more or less, according to locality, with Germanized English words. In parts of Pennsylvania are newspapers printed in this tongue. To give some idea of it, the following four lines from a poem by Dr. H. Harbaugh are given, together with the corresponding German:

"Ich seh sei rothe fligle plehn,
Wann er di feddere wescht:
Will wette, das de fraale hot
Uf sellem baum 'n nescht!"

The high German for the same is the following, with the exception of the last word of the first line, which is a re-spelt English word unaltered in pronunciation:

Ich sehe seine rothen Flügel PLAIN,
Wenn er die Federn wäscht:
Will wetten dass das Fräulein hat
Auf demselben Baum ein Nest!

A literal translation in English is as follows:

I see his red wings plainly,
When he washes his feathers:
(I) will wager that the female has
In the self-same tree a nest!

PENNSYLVANIA STATE COLLEGE, located at State College, Centre County, was organized in 1859 as the Farmers' High School, its name being changed in 1862 to the Agricultural College of Pennsylvania. The legislature having appropriated to the college the income from the proceeds of the national land-grant and its scope having been enlarged, its name was in 1874 again changed to the Pennsylvania State College. It is especially an industrial school, giving particular attention to practical and scientific agriculture, while it also provides instruction in mathematical, natural and physical sciences. The agricultural experimental station, in connection with the college, receives from the United States government an appropriation of $15,000 yearly. The state holds the proceeds of the national land-grant in trust, for which it has given its bond for $500,000, on which it pays interest to the college at the rate of six per cent per annum. Congress in 1890 passed a law appropriating to agricultural colleges $15,000 a year, to be increased annually $1,000 until it reaches $25,000. These appropriations enabled the institution to be well equipped in buildings, laboratories, libraries, museums, etc. It is under the control of a state board of 9 *ex-officio* and 15 elected members. There is an elementary course in mechanic arts. In 1904, there were 60 instructors and 765 students; the library had 21,720 volumes; the productive funds were $517,000; and the total income was $237,192.

PENNY, a coin. The precise etymology of the word is obscure. The early Anglo-Saxon form was *penning* or *penig*, and the Icelandic form *penningr* ("cattle" "money") may, presumably, have been derived from the same source; while the German form, *pfennig*, is perhaps only another variation of the same word, which may have had its birth in a common locality; but whence came the word itself, or what it originally meant, cannot be told. The earliest English, as well as the Continental use of the word *penny*, was as an equivalent of the Roman *denarius*, which had some circulation in northern Europe in the early centuries. Charlemagne, who formulated a medium of exchange for the Franks in the latter part of the eighth century, retained the Roman division of the *libra* (or pound of silver) into twenty *solidi*, and the *solidus* into twelve *denarii*, making the denarius or penny $\frac{1}{240}$ part of a pound-weight of silver. From this usage the entire coinage system of modern Europe has been derived. The application of the word which reaches farthest into the past is the modern English translation of Matthew xx: 2; but the *penny* here referred to was the denarius, which was coined by the Romans into both a silver and a large copper piece, and used in the latter shape in Judea. In the English currency the penny was originally a silver coin, and the only one current before the Norman Conquest. The first copper pennies (the twelfth part of the shilling) were struck in 1797, although copper half-pennies and farthings had been in use since 1672. In 1860 the metal was changed from copper to bronze, which form still remains, and consists of 95 parts copper, 4 of tin and 1 of zinc. Its weight is 145.833 grains troy. The letter "d," used as the sign of the penny, is from the Roman *denarius*. The name has also (although improperly) been applied to the United States *cent*.

PENN YAN, a village and the county seat of Yates County, New York, in the west-central part of the state. It lies at the head of Keuka Lake, 55 miles southeast of Rochester, and is reached by the Northern Central and the Fall Brook Coal Company's railroads, and by steamer from Hammondsport at the other end of the lake. It has some manufacturing industries, and, being in a grape-growing country, is one of the greatest wine-making places in the eastern states. It also

ships many grapes to market. Its population in 1900 was 4,650. W.F.J.

PENNYROYAL. For the English herb, see MINT, Vol. XVI, p. 515.

PENOBSCOT BAY AND RIVER form one of the chief topographical features of the state of Maine. The Penobscot River, the largest in the state, rises in the chain of hills which divides Somerset County, Maine, from the Canadian province of Quebec, and flows east and south across the state, traversing Piscataquis and Penobscot counties and forming the boundary between Waldo and Hancock counties. It flows through several lakes, the largest of them being Chesuncook and Pamedecook. The principal places along its course are Mattawamkeag, Lincoln, Oldtown, Orono, Bangor, Winterport and Bucksport. For many years an enormous trade in lumber has been conducted upon the river, to which has been added in recent years a very large trade in ice, especially for New York city. There are also considerable salmon and other fisheries on the river. Penobscot Bay is the huge tidal estuary of the river, about thirty miles long and the same width. It is bounded by or forms parts of Knox, Waldo and Hancock counties, and opens upon the Atlantic Ocean. It contains numerous islands, and some important cities and towns front upon it, including Castine, Rockland, Belfast and Searsport. Both the river and the bay abound in picturesque scenery, and are frequented by multitudes of tourists every year, and have been the theme of song and story. W.F.J.

PENOBSCOTS, a tribe of Indians of the Algonquin family, living on an island in Maine, near the mouth of the Penobscot River. They, with the Passamaquoddies, are members of the Abnaki branch of the Algonquins. For their services in the Revolution they received a large grant of land on the banks of the Penobscot, which they have mostly disposed of. The state controls a fund of fifty thousand dollars for their benefit. They number each about five nundred, and are Roman Catholics. These two tribes were originally called Malecites and Etechemins by the French settlers.

PENSACOLA, a city, port of entry and capital of Escambia County, extreme northwestern Florida, on Pensacola Bay, an inlet of the Gulf of Mexico, extending inland in a northeasterly direction about 35 miles, affording a deep and commodious harbor. Its entrance, about a mile wide, is defended by Forts McRae and Pickens. The city of Pensacola in 1890 had two railroads, the Alabama, Pensacola and Perdido and the Louisville and Nashville, and daily steamers running to Havana and New Orleans. The harbor is the finest on the Gulf of Mexico, and is the seat of a large commerce. During the year ending June 30, 1889, 622 vessels entered the port; and the exports for the same period were valued at $3,748,154; imports, $37,705. The principal shipments are of coal, fish, hides, tallow, wool, cotton, lumber and naval stores. Pensacola has gas and electric lights, water-works, street-railways, public parks, good school system, churches, banks, a number of fine buildings, including the United States government building, opera-house, courthouse, and state armory, and two daily and two weekly newspapers. Owing to its situation in a district liable to visitation from yellow fever, the sanitary and quarantine regulations of the port are most rigid. The assessed valuation of property in the city in 1893 was $2,303,400. Population 1890, 11,750; 1900, 17,747. See also PENSACOLA, Vol. XVIII, p. 515.

PENSIONS, UNITED STATES SYSTEM. A pension is a reward or allowance consisting of a periodical payment of a specified sum of money, granted by the government to a person retired from service, or to his widow and children, in consideration of his past services for the country. In the United States, pensions are paid to retired soldiers and sailors who have been wounded or disabled in the performance of their duty, and to their widows and dependent children.

The pension system of England, whereby allowances are paid to those who have been engaged for a long time in the service of the government in time of peace, whether as soldier or in a political capacity, and without regard to whether they have been injured or disabled, has never prevailed in the United States, though Congress may, and frequently does, grant special allowances in such cases, when one who has devoted his life to his country's service is left in indigent circumstances in his old age. In the United States, however, when a commissioned officer of the army has completed 40 years of service, and when he has reached the age of 65, and when a non-commissioned officer or private has completed 30 years of service, such persons may, upon application to the President, be placed upon the retired list with the rank held at the time retired, and for the remainder of life receive three fourths full pay.

Widows and children of deceased members of the life-saving service are entitled to receive pensions.

Except as above specified, pensions are not granted by the United States, except to soldiers and sailors who have received injury in the service, by wounds, sickness or otherwise, or who have since become mentally or physically disabled, or to those who served in the War of 1812 or the Mexican War, and to widows, children and dependent parents of deceased soldiers.

The system of pensions for disabled soldiers and sailors began by act of Congress of Aug. 26, 1776, which provided that every officer and private engaged in the Revolution, who should be rendered incapable of earning a livelihood by means of such service, should receive one-half pay during life, or the continuance of such disability. Pension laws have continually remained in operation since that time, but subject to such changes as the conditions required.

The substance of the pension laws in force at the present time are presented below.

The widow of a private, whose deceased husband's death resulted from injuries or disease which, under the existing laws, would entitle him to an invalid pension had he been disabled, receives $12 per month, and $2 additional for each child of the soldier under 16 years of age, to be paid to the widow dur-

ing her widowhood, and thereafter to his child or children until they reach the age of 16 years, or in case no widow or children under the age of 16 years, then the parents of such deceased soldier shall be entitled to $12 per month, if in dependent circumstances, during the continuance of such dependency.

Widows and dependent parents of commissioned officers received the "total of rank."

The act of June 27, 1890, commonly known as the Dependent Pension Act, provides that all persons who served for ninety days in the military or naval service of the United States during the War of the Rebellion, and who have been honorably discharged, and who were then or who might thereafter become unable to earn a support, through physical or mental disability not caused by vicious habits, whether such disability is the result of injury or disease brought about by such service or not, shall be entitled to be placed upon the list of invalid pensioners, and receive from $6 to $12 per month, according to the degree of their inability to earn a support.

This pension is to all ranks alike, and any one already receiving a pension may take advantage of this act to increase his pension, but shall not receive it in addition to that already allowed. The pension then allowed must be relinquished if this is claimed. This act also extends the right to receive a pension of $8 per month to the widow of any soldier who has served as above provided, and $2 per month, in addition, for each child under 16 years of age, without proving that the husband's death was the result of army service, such pension to be paid if such widow has no other means of support than her daily labor, and continues during her widowhood, and in case of her death or remarriage, such pension shall be paid to any child or children under 16 years of age. In case any child is insane or helpless, the pension shall continue to such child during such disability, or the life of the child.

The provisions as to soldiers' widows apply only to those who were married prior to the passage of the act. The fee of an attorney for presenting any claim under this act is limited to $10, and any greater charge is made a misdemeanor, punishable by fine not exceeding $500, or imprisonment at hard labor not exceeding two years, or both.

Widows or soldiers of the War of the Revolution receive $8 per month. Survivors of the War of 1812 receive one-half pay at the rate received at the time discharged, and in case of their death leaving a widow, she receives the pension to which her deceased husband was entitled at his death. The survivors of the Mexican War and the widows of deceased soldiers, if not remarried, receive $8 per month.

Before the name of any pensioner is placed upon the rolls, proof of the right to receive such pension is required, and false statements as to material facts render the person making them liable to indictment. Pensions are payable every three months, and agencies are established at different portions of the United States to distribute the vouchers to the proper persons. By statute of the United States, pension money due from the government is not subject to attachment or garnishment, and in many states pension money, and the property which has been wholly purchased by pension money, is exempt, in whole or in part, from the payment of the debts of the pensioner, and cannot be reached by any court process.

According to the report of the United States Commissioner of Pensions for the year ending June 30, 1896, the whole number of pensioners on the roll at that date was 970,678. This was a gain of only 154 over the total for 1895. As there were added 40,374 new pensioners and 3,873 were restored, making a total of 44,247, it can readily be seen that the death rate is very large. The amounts disbursed for pensions was $138,214,761.94,—a decrease of $1,592,575.36 as compared with 1895. The average annual value of each pension was $133.39; under the act of June 27, 1890, it was $109.55. There were, at the time of the report, 495,664 claims pending. Of 410,922 of the individual claimants, 234,337 were already in receipt of pensions.

PENTATHIONIC ACID. See CHEMISTRY, Vol. V, p. 440.

PENTATHLON, a fivefold athletic "event" in the national games of the ancient Greeks. It included leaping, foot-racing, wrestling, throwing the discus and throwing the spear, which latterly took the place of boxing.

PENTELICUS. See ATTICA, Vol. III, pp. 51–52.

PENTHESILIA. See AMAZONS, Vol. I, p. 576.

PENTLAND FIRTH. See CAITHNESS, Vol. IV, p. 574.

PENTLAND HILLS. See EDINBURGH, Vol. VII, pp. 569, 570.

PENTLANDITE. See MINERALOGY, Vol. XVI, p. 409.

PENUMBRA. See LIGHT, Vol. XIV, p. 585.

PENZANCE, JAMES PLAISTED WILDE, BARON, jurist; born in London, England, July 12, 1816. He was educated at Winchester and Cambridge, was called to the bar at Inner Temple in 1839, and devoted himself to marine and commercial law. He was appointed queen's counsel in 1855, and in 1860 was knighted and made a baron of the exchequer. He was judge of the courts of probate and divorce in 1863–72, and in 1875 was appointed judge of the public warship regulation court and the provincial (ecclesiastical) courts. Sworn a privy councilor in July, 1864, and created a peer of the realm as Baron Penzance in 1869, he became a member of the final court of appeal in the House of Lords. He served on numerous Parliamentary commissions. He died in London in 1899. G. J. H.

PEONY. See PÆONY, Vol. XVIII, pp. 136, 137.

PEOPLE'S PARTY. This name was given to a political party in the state of New York in 1824, an offshoot of the Democratic-Republicans, who favored the choosing of electors by the direct vote of the people. The party supported William H. Crawford, the Congressional caucus nominee of the Democratic-Republican party, who received in the electoral college 41 votes.

The name was later adopted by a party that was

evolved through the Greenback, Labor and Granger political organizations from 1884 to 1892. These associations, weak in isolated issues, tended to coalesce, and their aims became more clearly formulated and were seen to have a common purpose. The Greenback party became the National Greenback party, and in 1876 nominated for President and Vice-President Peter Cooper of New York and Samuel F. Cary of Ohio, the ticket polling 81,740 votes. The latter party, in the next Presidential campaign, expanded into the National Greenback-Labor party, and nominated for President and Vice-President James B. Weaver of Iowa and B. J. Chambers of Texas, the ticket polling 307,306 votes. In 1884 the party was commonly styled the People's Party and had its antimonopolistic champion in Benjamin F. Butler of Massachusetts, the Vice-Presidential candidate being A. M. West of Mississippi. This ticket polled 133,825 votes. The various elements constituting these parties then united with the Farmers' Alliance, and formed themselves into the People's Party, familiarly called the "Populists," whose origin and history up to 1892, when it held its first national convention, is detailed in the article on FARMERS' ORGANIZATIONS, in these Supplements. The aim of the party is to combine the wage-earners and the agriculturists of the country for the advancement of their interests, as against the exploitations of capital, and its socialistic character is pronounced, as may be seen from its platform.

The second national convention of the People's Party was held at St. Louis, July 22, 1896, and nominated, as its candidate, for President, William J. Bryan of Nebraska, who had already been declared the nominee of the regular Democrats, and for Vice-President, Thomas E. Watson of Georgia, in opposition to Arthur Sewall of Maine, who was on the Democratic ticket with Mr. Bryan.

The platform of 1896 declared for "natural money issued by the general government without the intervention of banks of issue, to be a full legal tender for all debts, public and private"; for free and unlimited coinage of silver and gold at the ratio of 16 to 1; for a volume of the circulating medium adequate "to restore the just level of prices of labor and production"; for legislation to "prevent the demonetization of the lawful money of the United States by private contract"; for the payment of its obligations, by the government, in any kind of lawful money, at its option; for an income tax; and for postal savings banks. It denounced the sale of government bonds to replenish the Treasury, unless explicitly authorized by specific acts of Congress, and the surrender by the government, to its creditors, of the option to choose the kind of money in which they are to be paid.

The platform further favored government ownership and operation of railroads and telegraphs; legislation against trusts and monopolies; the election of President, Vice-President and Senators by the direct vote of the people; home rule in the territories, and their early admission to statehood.

PEORIA, capital of Peoria County, northwestern central Illinois, is a city of remarkable growth and promise. It is pleasantly located on the west bank of the Illinois River, at the south end of Peoria Lake, an expansion of the river, 159 miles S. of Chicago, 65 miles N. of Springfield, 53 miles E. of Galesburg and 43 miles W. of Bloomington. It is the second city in the state in population, and is laid out after the most approved plans, with wide streets intersecting each other at right angles, handsomely shaded, and brilliantly illuminated with gas and electric lights, among its parks and drives Glen Oak Park is considered one of the handsomest in the United States; the various parts of the city are connected by electric street-railways; the residence, business and manufacturing districts have been built up with elegant and substantial structures perfectly adapted for the uses to which they are respectively devoted, while the undulating prairies with which the city is surrounded are dotted with evidences of the taste and cultivation of the people. It is a prominent railroad city, being the intersection of the Chicago, Alton and St. Louis, Lake Erie and Western, Chicago, Peoria and St. Louis, Peoria Decatur and Evansville, Peoria and Pekin Union, Cleveland, Cincinnati, Chicago and St. Louis, Iowa Central, Toledo, Peoria and Western, Rock Island and Peoria, Chicago, Rock Island and Pacific, Chicago, Burlington and Quincy and Peoria Terminal railroads; also, the terminus of a line of steamboats that plies between the city and St. Louis. It contains a courthouse, United States government building, city hall, five first-class hotels, about thirty churches; the Peoria County normal school, a high school and a number of subordinate schools, six national, two private, four state and five savings banks; between two and three hundred stores devoted to every line of commercial endeavor; an opera-house and two public halls with an aggregate seating capacity of 4,100. The returns for 1900 showed 50 chief industries in 871 establishments, with a combined capital of $27,971,613, giving employment to 8,022 persons, paying in wages $3,901,186, and having a product valued at $48,871,596. The representative industries embrace enterprises conducting the manufacture of engines and machinery, agricultural implements, trunks, glucose, brass fixtures, cigars, carriages, brushes, brooms, sashes, doors and blinds, soap, high wines and bitters, patterns, safes, baskets, mantels, coal-drills, saws, metal rope, jewelry, cornices, elevators, stoves and hardware specialties, marble mantels, grain-registers, watches, etc., and other intricate mechanical devices. The distilling industry is the most important, being represented by 11 establishments, having an annual product of $26,792,354 in value of spirits, and an annual government tax of about $21,000,000. Five daily newspapers, 2 of which are German, 11 weeklies and 2 monthlies are published here, and a heavy business is done annually in the shipment of bituminous coal taken from mines operated on the city's outskirts. The shipments of grain are very large, Peoria in 1890 ranking eighth in the United States in the amount of grain shipped. Population 1870, 22,849; 1880, 29,259; 1890, 41,024; and in 1900, 56,100. See also PEORIA, Vol. XVIII, p. 526.

Revised by R. W. C.

PEPIN, a Carlovingian family. See PIPPIN, Vol. XIX, p. 122.

PEPIN LAKE, 25 miles long and from two to three miles broad, occurs in the course of the Mississippi River, at the boundary between Wisconsin and Minnesota. It extends from Red Wing in Goodhue County, to Wabasha, in Wabasha County, both in Minnesota, the Wisconsin border being formed by Pierce and Pepin counties. Limestone cliffs in some places 400 feet high fringe the lake which has great scenic beauty and is a boating and angling resort. C.L.S.

PEPPER, WILLIAM, educator; born in Philadelphia, Pa., Aug. 21, 1843; was graduated at the University of Pennsylvania in 1862, and at its Medical Department in 1864. He entered upon the practice of his profession immediately and gained great distinction, becoming known as one of the most expert physicians in the United States. He was lecturer on clinical medicine in the University of Pennsylvania in 1870–76, and professor of the same branch in 1876–87. In the latter year he succeeded Dr. Alfred Stillé as professor of theory and practice of medicine. In 1881 he was chosen provost of the university. Under his administration the institution greatly prospered. Just after his installation the Wharton School of Finances and Economy was founded. In 1882 the department of philosophy for post-graduates was organized, and in the same year the city of Philadelphia established fifty perpetual scholarships for graduates of its public schools. In 1883 the department of veterinary medicine was introduced, and in 1884 that of biology. In 1891 the school of American history was established and the following year the department of hygiene. When Dr. Pepper resigned in 1894 it was discovered that he had not only sacrificed a great deal of practice, but had refused to accept any salary during his incumbency. He, moreover, at the time of his resignation, donated $50,000 toward the University hospital. During his term as provost the students of the university increased from 981 to 2,180, the faculty from 88 members to 268. He died near Oakland, Cal., July 28, 1898. G.J.H.

PROFESSOR PEPPER.

PEPPERS, Old World spice. See PEPPER, Vol. XVIII, pp. 526–528.

PEPPERS, garden plants of the genus *Capsicum*. See CAYENNE PEPPER, Vol. V, pp. 243, 244; and HORTICULTURE, Vol. XII, pp. 291, 292.

PEPPERBRAND, a fungus. See AGRICULTURE, Vol. I, p. 315.

PEPPERIDGE, a tree. See BLACK GUM, CORNACEÆ, GUM-TREE, and TUPELO, in these Supplements.

PEPPERRELL, SIR WILLIAM, a British soldier; born in Kittery, Maine, June 27, 1696. At the age of 21 he was appointed captain of a company of cavalry, and at the age of 30 was advanced to a colonelcy. In 1730 Governor Belcher appointed him chief justice of the court of common pleas, which office he retained until his death. In 1745 Colonel Pepperrell was appointed to command the New England expedition against Louisburg on the island of Cape Breton, and, supported by the fleet of Commander Warren, on June 17th captured it. He was created a baronet in 1746, colonel in the British army (1749), major-general (1775). He was appointed lieutenant-general (1759) and was acting governor of the colony (1756–58). He published, in 1753, *Conference with the Penobscot Tribe.* He died at his native place, July 6, 1759.

PEPSIN. See NUTRITION, Vol. XVII, pp. 690 et seq.

PEPTONIZED FOOD is food treated with pancreatin and other substances with a view of rendering its nitrogenous elements more easily digestible, thus providing nourishment for those whose digestion is weak. The conversion of albumen, casein, fibrin, etc., is caused by trypsin which is similar to pepsin in the gastric juice. It is a process of great value in dietetics. Lean minced beef is peptonized by treating it with a solution of blood-warm water, containing 5 to 20 grains of pancreatin and 5 grains of bicarbonate of soda to each pint. The result is a granulated or spongy friable yellowish substance, of faintly animal smell and bitter relish, soluble in water. The peptonizing may be arrested by bringing the liquid to the boiling point, or by refrigeration, which stops fermentation. W.R.B.

PEQUODS OR PEQUOTS. See INDIANS, Vol. XII, p. 870.

PERA, a suburb of CONSTANTINOPLE; q. v., Vol. VI, pp. 273, 274.

PERÆA. See GILEAD, Vol. X, p. 531.

PERCEPTION. See PSYCHOLOGY, Vol. XX, pp. 56–62; and APPERCEPTION in these Supplements.

PERCHING BIRDS. See INSESSORES, in these Supplements.

PERCHLORIC ACID. See CHEMISTRY, Vol. V, p. 429.

PERCIDÆ. See PERCH, Vol. XVIII, p. 532; and ICHTHYOLOGY, Vol. XII, p. 726.

PERCIVAL, JAMES GATES, an American poet and geologist; born in Berlin, Conn., Sept. 15, 1795. He graduated at Yale in 1815, and, after teaching for a short time in Philadelphia, studied medicine and botany. He made two unsuccessful efforts to practise medicine; first in his native town, and later in Charleston, S. C. In 1824 he was appointed assistant-surgeon in the army and was detailed to duty at West Point as professor of chemistry. He soon resigned this position and was transferred to the recruiting-office in Boston. In 1827 he removed to New Haven and assisted in the preparation of *Webster's Dictionary*. He had meanwhile studied geology, and in 1835 was engaged on a geological and mineralogical survey of Connecticut. In 1853 he undertook a survey of mining property in Wisconsin, and in 1854 was appointed geologist of that State, a position

he held until his death. He was a philologist of no mean attainments. Among his publications are *Prometheus, and Other Poems* (1820); *Clio* (1822–27); a translation of Malte-Brun's geography (1833); *The Dream of a Day* (1843); and a posthumous collection of his poems in two volumes (1860). He died in Hazel Green, Wis., May 2, 1857. E.E.T.

PERCOPSIDÆ, the family of trout-perches. These fishes bear resemblances both to trout and perch. There are two genera, both North American. The sand-roller (*Percopsis*) is a small, valueless fish which lives near the shores of the Great Lakes, and is abundant near wharves. The genus *Columbia* is confined to rivers in the Columbia River region. It is a large fish and important as a food-fish.

PERCUSSION. See MEDICINE, Vol. XV, 824.

PERCUSSION FUSE. See AMMUNITION, Vol. I, p. 653.

PERCY, HENRY (HOTSPUR). See PERCY, Vol. XVIII, p. 534.

PERCY, JOHN, a British metallurgist; born in Nottingham, England, in 1817; educated in Paris and in Edinburgh, where he was a pupil of Sir C. Bell, and where he graduated M.D. For some years he was in medical practice at Birmingham. Dr. Percy was appointed, in 1851, professor of metallurgy in the Royal School of Mines, holding that office till December, 1879. He was the author of an important work on *Metallurgy; or, The Art of Extracting Metals from Their Ores and Adapting Them to the Various Purposes of Manufacture*, with illustrations (1861); *The Metallurgy of Gold, Silver and Lead* (1869); and *The Metallurgy of Lead, Including Desilverization and Cupellation* (1871). The Iron and Steel Institute, on Jan. 25, 1877, awarded their Bessemer medal to Dr. Percy for his works on metallurgy, especially those on iron and steel. He died June 19, 1889.

PERDU, a mountain. See PYRENEES, Vol. XX, p. 131.

PEREDA, JOSÉ MARIA DE, a Spanish novelist; born in Santander in 1833; early devoted himself to the study of the life he found around him, and gave it literary expression in the form of sketches, which began to appear about 1855 in a journal published in his native town. These sketches he collected in 1864, and published, with the title *Escenas Montañesas*. This was followed by *Tipos y Paisajes* (1871); *Bocetos al Temple* (1876); *Tipos Trashumantes* (1877); *El Buey Suelto*, a more ambitious attempt (1877); *Don Gonzalo González de la Gonzalera*, a political tale (1878); *De tal Palo, tal Astilla* (1879); *Esbozos y Rasguños* (1881); *Pedro Sánchez* (1883); *Sotileza* (1884); *La Montálvez* (1887); *La Puchera* (1888); *Nubes de Estío* (1891); *Al Primer Vuelo: Idilio Vulgar* (1891); etc.

PEREGRINE FALCON. See FALCON, Vol. IX, p. 4.

PÈRE HYACINTHE. See LOYSON, CHARLES, in these Supplements.

PEREIRA DA SILVA, JOÃO MANOEL, historian; born in Rio de Janeiro, Aug. 30, 1817. His publications include *History of the Founding of the Empire of Brazil; Portuguese Literature: Its Past and Present; Brazilian Plutarch; Jeronimo Corte-Real; Second Period of the Reign of Dom Pedro I in Brazil; History of Brazil during the Minority of Dom Pedro II, 1831–40*, and *Epic Poetry*. G.J.H.

PERE LA CHAISE. See CEMETERY, Vol. V, p. 287.

PERESKIA. See CACTUS, Vol. IV, 555, 556.

PEREZ, SANTIAGO, a Colombian statesman and diplomat; born in Cipaquira in 1830. He studied in Bogota and was admitted to the bar in 1851. In 1856 he was the editor of *El Tiempo*. He was elected to Congress in 1863 and in 1864 was appointed secretary of the interior and foreign affairs. From 1870 to 1872 he was minister to the United States. In 1873 he was elected president of Colombia, and later was appointed rector of the National University. W.M.C.

PEREZ GALDÓS, BENITO, a Spanish novelist; born in 1845, at Las Palmas, in the Canary Isles. As a writer of fiction he first distinguished himself by the publication of two historical romances relating to the state of Spain in 1820 and 1824, and entitled, respectively, *La Fontana de Oro* (1871) and *El Audaz*. Next, in imitation of MM. Erckmann-Chatrian, he published two series of *Episodios Nacionales*, the first dealing with subjects taken from the war of independence against Napoleon and the second describing the struggle of Spanish liberalism against the tyranny of Ferdinand VII. These novels achieved a great success in Spain and were also widely read in Spanish America. They include *Bailén* (1873–75); *Napoleón en Chamartin* (1874); *Cadiz* (1874); *La Batalla de los Arapiles* (1875); *El Terror de 1824* (1877); *Doña Perfecta* (1880); *El Amigo Manso* (1881); *Lo Prohibido* (1884); *Miau* (1888); *La Incógnita* (1890); *Angel Guerra* (1891). He died in April, 1897.

PERFECTIBILISTS. See ILLUMINATI, Vol. XII, p. 745.

PERFECTING PRESSES. See PRESSES, in these Supplements.

PERFECTIONISM, the name of a doctrine of a mystical state in which the believer is freed from responsibility for sin in his members. In no case do those who claim to have reached perfection assume superiority for goodness over others, as their condition is purely the work of grace, so that they can lay no claim of merit to it, and because they are only free from imperfections and guilt in not consenting to it. The doctrine has had many phases of expression, from the rapture of a John Tauler or a Madame Guyon to the Oneida Brethren of New York, who bore the self-selected name of "Perfectionists" (see Vol. XVII, pp. 794, 795). Support for the doctrine is found in such passages as "whosoever is born of God sinneth not; but he that is begotten of God keepeth himself, and that wicked one toucheth him not" (1 John v, 18). The root of the corresponding experience is simply such complete self-consecration to God, that the soul rejects all estrangement, and wishes nothing but to do God's will. Of course, such a disposition is possible, though rare. It does not imply, however, that the soul realizes its ideal in performance, but only

in intent. Hence the perfected one may show the limitations of ignorance, prejudice and even of the surprises of passion. The whole experience is mystical, is peculiar to certain dispositions, and stands on the brink of antinomianism—sometimes fall over into the abyss.

Recognizing that all men have not equal capability of devotion, the Roman Catholic Church has its "Counsels of Perfection" for those who feel the vocation to a complete spiritual life. It distinguishes between the obedience necessary to salvation and the works which are counseled of God, but not commanded. There are mortal and venial sins, and the first are violations, of imperative law. Venial sins do not imperil salvation, and are not incompatible with works that may be done by those who "would be perfect." Hence arises a doctrine of works of supererogation, or that belong to the "Counsels of Perfection." Those who do them do so of divine grace, and hence acquire no personal merit in their performance. But these gifts of God are to the church, through the individual, and hence are susceptible of vicarious use.

Among Quietists, Friends, Plymouth Brethren and certain Methodists, as well as among other unworldly sects of mystic tendencies, perfection is the equivalent for a state of sanctification, and not for the complete achievement thereof. It is potential sanctification,—a keeping of God. They sometimes call it "entire sanctification," meaning a complete consecration of soul to God,—a dominant, all-pervading purpose to do God's will. The wrong they do they would not. In their state of grace they are not responsible for sin working in their members, or for the delusions and betrayals of the devil.

The achievement of consecration, even to utter self-effacement, is possible for weak, limited and tempted man. Too often those who think they have reached that state find, in the stress of trial, that they have been self-deluded; others, overcome by temptation, have claimed that for the pure in heart there is no law, and so have given themselves up to follow their own impulses.

Dogmatic Christianity allows scant place for entire sanctification or perfectionism on earth. The orthodox Protestant belief is that sanctification is a progressive process never completed this side of the grave, and that every Christian has daily need to pray for the forgiveness of sins.

PERIANTH. See Botany, Vol. IV, 113, 114.

PERICARDITIS. See Rheumatism, Vol. XX, p. 531.

PERICARDIUM. See Anatomy, Vol. I, 790.

PERICARP. See Botany, Vol. IV, pp. 134, 135.

PERICHÆTA. See Worms, Vol. XXIV, 718.

PERICLES, Age of. See *Third Period*, under Archæology, Vol. II, pp. 309–314.

PÉRIER, Auguste Casimer Victor Laurent, statesman; born in Paris, France, in 1811, son of Casimer Perier (1777–1832), minister of finance in 1828 and premier of France in 1831. Elected to the French Chamber of Deputies in 1846, M. Perier became a member of the Legislative Assembly under the republic of 1849. As such he voted with the majority and protested against Louis Napoleon's *coup d'état* of December, 1851. He died in Paris, June 6, 1876. G.J.H.

PÉRIER, Casimir. See Casimir-Périer, in these Supplements.

PERIER, Casimer, statesman; born in Grenoble, France, Oct. 21, 1777. He became a prosperous banker at Paris, was elected to the Chamber of Deputies in 1815, voted with the Opposition, actively supported the popular cause in the revolution of 1830, and became prime minister in 1831. As such he repressed all attempts at revolution and resisted the popular pressure to aid the Poles at the cost of war with the Allied Powers. He died in Paris, May 16, 1832. G.J.H.

PERIGEE. See Apogee, in these Supplements.

PERIHELION. See Astronomy, Vol. II, pp. 695, 696.

PERIM, a small island and since 1884 a British coaling station in the Strait of Bab-el-Mandeb, at the entrance to the Red Sea. It is about 1½ miles from the coast of Arabia, opposite Mocha, and about 10 miles distant from the coast of Africa. It rises to a height of 245 feet, a bleak, arid, and barren rock about 4 miles long and 1½ miles wide. Arab fishermen frequent its shores to catch turtles, but its value is purely strategic, and it was an object of British solicitude as early as 1799. It is fortified, has a small garrison and is administered from Aden, 95 miles to the east. C.L.S.

PERIODICALS. See Vol. XVIII, pp. 546, 556; and Magazines, in these Supplements.

PERIODIC RELATIONS OF THE ELEMENTS. See Chemistry, Vol. V, pp. 470, 471.

PERIŒCI. See Sparta, Vol. XXII, p. 384.

PERIOSTEUM and PERIOSTITIS. See Surgery, Vol. XXII, pp. 719, 720.

PERIPATUS. See Myriopoda, Vol. XVII, pp. 123, 124.

PERISCOPE, an instrument used on submarine boats for enabling a person inside to see about the horizon above. It consists of an upright telescope, with a mirror placed at the lower end, so that the observer can look in horizontally. At the top is placed a lenticular total-reflecting prism. The apparatus may be turned toward any part of the horizon. See Altiscope, in the Supplements.

PERISSODACTYLA. See Mammalia, Vol. XV, p. 433.

PERISTALSIS. See Nutrition, Vol. XVII, pp. 689, 690.

PERISTEROPODES. See Guan, Vol. XI, p. 206.

PERISTYLE. See Architecture, Vol. II, p. 413.

PERITONEUM. See Digestive Organs, Vol. VII, p. 194; and Peritonitis, XVIII, 558, 559.

PERIWINKLE, a plant. See *Vinca*, under Horticulture, Vol. XII, p. 260; and Mollusca, Vol. XVI, p. 673.

PERKIN, William Henry, an English chemist, and the discoverer of aniline; born in London.

March 12, 1838. He was educated at the City of London School; made phenomenal progress in chemistry under Dr. A. W. Hoffman, at the Royal College of Chemistry, becoming assistant to the latter in 1855. The following year, while conducting an experiment at home for the production of quinine synthectically, he discovered "aniline purple" or "mauve." This discovery led to the development of the industry of the production of colors from coal-tar products, which became, in his hands, in association with his father and brother, under their firm name of Perkin and Sons, an immense enterprise. He retired from the prosecution of technical work in 1873. During all the period of his active research he conducted many investigations in other lines, one of his more noted achievements being in connection with salicylic aldehyde, showing that this substance is not only an aldehyde, but a phenol. This resulted in the artificial production of coumarin and other odoriferous substances. A new reaction known as "Perkin's reaction" also resulted, by means of which other experimenters were able to produce cinnamic acid. His researches into the property of substances to rotate the plane of polarization when placed in the field of a magnet, by showing that it varies with bodies in a definite manner, was of the first importance as making available a new means of determining the constitution of bodies. In 1866 he was elected a fellow of the Royal Society; elected president of the Chemical Society in 1883; received the degree of Ph.D. from Würzburg in 1882; and that of LL.D. from St. Andrews in 1891. He received the royal medal and the Davy medals from the Royal Society, and the Albert medal from the Society of Arts.

PERKINS, Charles, an American art critic; born in Boston, March 21, 1823; graduated at Harvard in 1844; studied art in Paris and in Rome; he then took to etching and illustrated his own books; visited Europe frequently with the object of becoming an experienced art critic in his native country. The first work to bring him into notice was *Tuscan Sculptors* (2 vols., 1865), with over seventy of his own etchings. He also published *Italian Sculptors* (1868); *Art in Education* (1870); *Raphael and Michael Angelo* (1878); *Sepulchral Monuments in Italy* (1883); *History of the Handel and Haydn Society* (1883); and *Ghiberti et son École* (Paris, 1886). All these works exhibited his diligence in securing fresh biographical data. He annotated Jacob von Falke's *Art in the Household* (1879); and in collaboration with J. D. Champlin, Jr., brought out an *Encyclopædia of Painters and Painting* (4 vols., 1886–88). He died in Windsor, Vermont, Aug. 25, 1886.

PERKINS, Elisha, an American physician; born in Norwich, Conn., Jan. 16, 1741. He began the practice of medicine in Plainfield, Conn., and was very successful. About 1796 he brought forward an invention which he called "metallic tractors," consisting of two rods about three inches in length and pointed at the ends. One resembled brass, and the other steel, but the inventor claimed that they were made of a secret combination of metal. They were used chiefly in local inflammations, such as pains in the head face, teeth, and side, in rheumatism, and diseases of a similar character, the points being applied to the affected part, and then drawn over it in a downward direction for about twenty minutes. For a time this method of cure enjoyed great reputation, not only in America, but in Europe. Five thousand cures by these instruments in London were certified to by eight professors, forty physicians, and thirty clergymen, and the claims of cures reached a fabulous number; but the tractors fell into neglect almost as speedily as they became famous. Dr. Perkins fell a victim to yellow fever in an attempt to utilize an antiseptic of his own invention against that disease, and died in New York, Sept. 6, 1799. E.E.T.

PERLIDÆ. See Insects, Vol. XIII, p. 158.

PERMANGANATES. See Manganese, Vol. XV, p. 488.

PERMEABILITY, Magnetic. See Electricity, § 57, in these Supplements.

PERMIAN SYSTEM. See Geology, Vol. X, pp. 311, 312.

PERMUTATION. See Algebra, Vol. I, pp. 493, 494.

PERNOFF. See Pernau, Vol. XVIII, p. 563.

PERONOSPOREÆ. See Fungus, Vol. IX, pp. 727, 729.

PÉROUSE, Jean François. See La Pérouse, Vol. XIV, p. 298.

PEROWNE, John James Stewart, theologian; was born at Burdwan, Bengal, on March 13, 1823, the son of an English missionary, of French ancestry, and was educated at Cambridge University, where he was one of the most brilliant scholars of his time. He was graduated in 1845 and became a fellow of Corpus Christi College in 1849. He was Hulsean lecturer in 1868; canon residentiary of Llandaff in 1869; lecturer in King's College, London; vice-principal of Lampeter College; prelector in theology and fellow of Trinity College, Cambridge, and dean of Peterborough Cathedral in 1878. In 1875 he became, also, Hulsean professor of divinity at Cambridge University. In 1891 he was made bishop of Worcester. He was a prominent and influential member of the committee on the revision of the Old Testament, and was the chief editor of the *Cambridge Bible for Schools*. His published works include also a *Commentary on the Psalms* (1864–68); a compilation of his Hulsean lectures at Cambridge on *Immortality* (1869); a volume of *Sermons* (1873) preached at Llandaff and at Lampeter College, and an edition of the *Remains* of Bishop Thirlwall (1878). W.F.J.

PEROXIDE OF HYDROGEN. See Bleaching, Vol. III, p. 713.

PERPETREA, Cape, a point of land on the Pacific Coast, in northern Lane County, central western Oregon. On it is situated a lighthouse with a fixed white light of the first order, 150 feet above sea-level. Lat. 44° 16′ 33″ N., long. 124° 5′ W.

PERPETUITY. See Annuities, Vol. II, pp. 65, 66.

PERRAULT, Claude (1613–88), a French archi-

tect, brother of Charles (Vol. XVIII, p. 568). See PARIS, Vol. XVIII, p. 298.

PERRON, stairs. See ARCHITECTURE, Vol. II, p. 413.

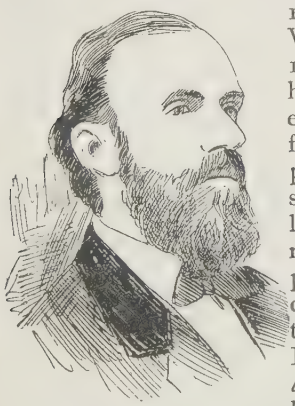
PERRON, DU. See ANQUETIL DU PERRON, Vol. II, p. 81.

PERROT, GEORGES, historian of art and archæologist; born in the village of St. George, France, Nov. 12, 1832. He early devoted his attention to archæology and art in which studies he became very proficient. In 1877 he was chosen professor of archæology in the Faculty of Letters. After several years of service in this capacity he was, in 1883, made director of the Upper Normal School. Later he went to Asia Minor to carry on archæological explorations. He was the first to make an entire copy of the famous inscription on the monument to Augustus in Ancyra. In conjunction with the architect, C. Chipiez, he published the *History of Art in Antiquity*, a work which treats of art in Asia Minor, Chaldea, Egypt, etc., and which has won world-wide recognition. G.J.H.

PERRY, a city of Dallas County, southwestern central Iowa, on the Raccoon River, and on the Chicago, Milwaukee and St. Paul and Chicago, Rock Island and Pacific railroads, 34 miles W.N.W. of Des Moines. It is in an agricultural, stock-raising and coal-producing region; has good public schools, electric lights, water-works, a daily and three weekly papers, foundries, flour-mills and machine-shops. Population 1890, 2,880; 1900, 3,986.

PERRY, a city and the capital of Noble County, northeastern Oklahoma, 34 miles N. of Guthrie, on the Atchison, Topeka and Santa Fé railroad. Settled in 1893, the growth of this place has been remarkable. It contains churches, public and private schools, banks, a board of trade, United States land-office, a daily and five weekly papers, and is an important trade center for a large surrounding territory. Population (1900), 3,351.

PERRY, ARTHUR LATHAM, an American political economist; born in Lyme, N. H., Feb. 27, 1830. He graduated at Williams College in 1852; was professor of history and political economy at Williams from 1853 to 1891, and professor emeritus of the same science since the latter date. Since his retirement from active professional life he has devoted much time to the writing of history. He is the author of *Political Economy*, which has passed through 20 editions; *Williamstown and Williams College;* and of many public addresses in behalf of free trade. E.E.T.



ARTHUR L. PERRY.

PERRY, JOHN, an English electrician and physicist; born in Garvagh, a town in Ulster, Ireland, in 1850; graduated at Queen's University of Ireland, in 1870, as bachelor of engineering. In 1882 the university senate conferred upon him the honorary degree of master in engineering. From 1870 to 1874 he lectured on physics at Clifton College; was secretary of the A section, British Association, in 1874; and in the same year became the assistant and associate of Sir William Thomson (see KELVIN, in these Supplements). In 1875 he read a paper on *The Electric Conductivity of Glass as Dependent on Temperature*, before the Royal Society of London; and another paper, conjointly with Sir William Thomson, on *Capillary Surfaces of Revolution*, before the Royal Society of Edinburgh. In 1875 he went to Japan as instructor in the Imperial College of Engineering, returning home in 1879. In 1882 he became professor of mechanical engineering and applied mathematics in the Finsbury Technical College, conjointly with Professor William E. Ayrton (q.v., in these Supplements). He was inventor of a large number of practical electric appliances, among which are meters of various sorts, a dynamo, motors, accumulators, switches, an electric lamp, and many others. He became a fellow of the Royal Society in 1885; and the degree of doctor of science was conferred on him by the Royal University of Ireland. Perhaps his most valuable invention is the electric-supply meter. Besides the papers mentioned, he wrote upon *The Future Development of Electrical Appliances* (1881), and a number of others in partnership with Professor Ayrton.

PERRY, MATTHEW GALBRAITH, a commodore in the United States navy, was born in Newport, Rhode Island, April 10, 1794. He conducted the skillful negotiations which, without force or bloodshed, opened Japan to foreign commerce in 1854. He died in New York, March 4, 1858.

PERRY, NORA, author; born in Dudley, Mass., in 1832. Shortly after her birth her father settled in Providence, R. I., and she there spent her early life. She began to show her taste for literature as early as 1840, when she wrote a short story entitled *The Shipwreck*. She at first wrote entirely in verse. The poem which brought her public attention was entitled *Tying Her Bonnet under her Chin*. A year later she wrote *After the Ball*, which was published in the *Atlantic Monthly*. Longfellow called this poem very artistic and years after its publication said he would have been glad to have written it himself. Miss Perry was long correspondent for the Providence *Journal* and the Chicago *Tribune*. She also became known as a writer of girls' stories. She published *After the Ball and Other Poems; A Rosebud Garden of Girls; Hope Benham*, etc. She died May 14, 1896. G.J.H.

PERRY, OLIVER HAZARD, an American naval officer; born in South Kingston, near Newport, R. I., Aug. 23, 1785. He entered the United States navy as a midshipman in April, 1799, cruised among the West Indies, and served in the war against Tripoli. In 1807 he was promoted to the grade of lieutenant, and in 1809 was given command of the schooner *Revenge*, which in 1811 was wrecked on Watch Hill Reef off the coast of Rhode Island. An official court of inquiry ac-

quitted him of any neglect or carelessness. At the beginning of the War of 1812, he was in command of a division of gunboats at Newport, R. I., but in Feb., 1813, was transferred, at his own request, to Lake Erie under the command of Commodore Isaac Chauncey. At Presque Isle he superintended the building and equipment of a fleet of nine small vessels, and was placed in command. On Sept. 10, 1813, he encountered a British fleet under Barclay near Put-in-Bay, and after a hard-fought battle the British surrendered. Perry sent to General Harrison the despatch which has become famous in American history, "We have met the enemy and they are ours." Perry's victory was most important, giving the Americans the control of Lake Erie, and enabling Perry to cooperate with General Harrison and the land forces in the operations which resulted in the British evacuating Detroit. Perry became one of the heroes of the war. Congress gave him a gold medal and he was promoted captain. In 1814 he was appointed to command the *Java*, and took part in the defense of Baltimore. After the war he cruised in the Mediterranean with Decatur's squadron. He was appointed a commodore and in 1819 was given command of a squadron for the West Indies. In July he ascended the Orinoco River to Angostura, where he was seized with yellow fever and died at Port of Spain, Trinidad, August 23, 1820. In 1826 his remains, by an Act of Congress, were removed to Newport, R. I. The state of Rhode Island afterward reared a monument over his grave. There is a bronze statue of Perry in Newport and a marble statue in Cleveland, O. W.M.C.

COMMODORE O. H. PERRY.

PERRY, William Stevens, an American clergyman, bishop of the Protestant Episcopal Church; born in Providence, Rhode Island, Jan. 22, 1832; graduated at Harvard in 1854, and entered holy orders in 1857. He began as an evangelical, but in later years, became a recognized champion of the highest episcopal prerogative. He held rectorships and assistantships in Boston, in Portland, Maine, in Nashua, New Hampshire, and in other places. He became president of Hobart College in 1876, and bishop of Iowa and president of Griswold College in the same year. In 1891 he publicly refused to consent to Phillips Brooks's consecration as bishop of Massachusetts unless Dr. Brooks should retract his rejection of the dogma of apostolic succession. He compiled numerous works, and wrote the articles on points of rites, titles, ceremonial forms, and prelatical honors for a recent edition of an American cyclopædia. Died at Dubuque, Ia., May 13, 1898.

PERRYSBURG, a village of Wood County, northwestern Ohio, at the head of navigation on the Maumee river, nine miles S.W. of Toledo, and on the Cincinnati, Hamilton and Dayton railroad. It has good water-power and manufactures of flour and lumber. Ship-timber and staves are shipped in large quantities from this point. Population 1900, 1,766.

PERRYVILLE, a village of Boyle County, central Kentucky, about 40 miles S.W. of Lexington and 12 miles W. of Danville. It is celebrated as the scene of a hard-fought battle between the Union and Confederate armies of Buell and Bragg, Oct. 8, 1862. General Bragg, with 40,000 troops, was retreating into East Tennessee when, overtaken by Buell with 58,000 men, he was forced to turn and give battle. The fight was a desperate one, lasting all day, and at its close Bragg retired, but was not followed by Buell. The Union loss was placed at 4,300, and the Confederates were thought to have been even heavier. Population 1900, 431.

PERRYVILLE, a village and the capital of Perry County, southeastern Missouri, 76 miles S.E. of St. Louis, 14 miles S. of Chester, Illinois, and about 10 miles from the Mississippi River, on the Chester, Perryville, Ste. Genevieve and Farmington railroad. It is in a region producing large quantities of wheat, besides corn, oats, barley, wool, sorghum, potatoes, tobacco and live-stock. Population 1890, 875; 1900, 848.

PERSEPHONE. See Proserpine, Vol. XIX, p. 846.

PERSEUS, the last king of Macedon. See Rome, Vol. XX, pp. 772, 773.

PERSIA. (For general article, see Persia, Vol. XVIII, pp. 573–673.) The latest published official estimate (that of 1881) reported the area at 628,000 square miles. Population, based mainly on estimates in 1881, as follows:

Inhabitants of cities	2,000,000
Population belonging to wandering tribes	2,000,000
Inhabitants of villages and country districts	3,750,000
Total population	7,750,000

The estimated population in 1899 was 9,000,000. The number of European and American residents does not exceed 1,000.

The principal cities of Persia are: Teherân, with a population of 250,000; Tabrîz, 180,000; Ispahân, 80,000; Meshed, 60,000; Barfurush, 50,000; Kerman, 45,000; Resht, 41,000; Kazvin, 40,000; Yezd, 40,000; Hamadan, 35,000; Kermansha, 32,000; Shiraz, 32,000; Dizful, 30,000; Kashan, 30,000; and Kom, 25,000. Of the nomads, 260,000 are Arabs; 720,000 Turks; 675,000 Kurds and Leks; 20,700 Baluchis and gipsies; 234,000 Lurs.

Reigning Shah and Royal Family. Muzaffar-ed-dîn (q. v., in these Supplements) succeeded to the throne upon the assassination of his father, Nâsr ed-dîn (q. v., in these Supplements), May 1, 1896, and was crowned June 8, 1896. Muzaffar-ed-dîn, born March 25, 1853, has 6 sons and 12 daughters.

The royal family is very numerous; there are some thousands of princes and princesses, but the official year-book only mentions 2 uncles, 2 aunts, and about 100 great-uncles, and cousins of the late Shah.

The Shah of Persia—by his official title "Shâhinshâh," or "king of kings"—is absolute ruler within his dominions, and master of the lives and goods of all his subjects.

The whole revenue of the country being at their

disposal, recent sovereigns of Persia have been able to amass a large private fortune. The wealth of Muzaffar-ed-dîn is reported to amount to $25,000,000 or $30,000,000, most of it represented by diamonds, the largest, the Deryâ i Nûr, of 186 carats, and the Tâj i Mâh, of 146 carats, and other precious stones, forming the crown jewels.

The government of Persia is a pure despotism, limited only by the power and influence of the Mohammedan mollahs or priests, domestic intrigues, dread of private vengeance, and an occasional insurrection. The first-named is the principal check against unjust government on the part of the monarch, while the latter three operate as powerful restraints on his ministers. The Shah possesses absolute authority over the lives and property of his subjects. His deputies, the governors of provinces and districts, possess similar authority over those under them; their actions are, however, liable to revision by the Shah, who may summarily inflict any punishment upon them for real or alleged misgovernment. Oppression of the sedentary agricultural classes is almost a necessity of such a form of government. The central government consists of a ministry, nominally modeled somewhat after the cabinets of European states. Usually, however, the power falls actually, if not nominally, into the hands of one of their number. The Shah, nevertheless, is in reality his own prime minister, and even trivial matters are submitted for his personal decision. The principal ministers are those for the interior (practically the head of the government), for foreign affairs, for finance, for war, for telegraphs, etc., for justice, and the president of the council, who is at the same time postmaster-general and general secretary of state. The law, both in civil and criminal cases, is administered by the governors, who not infrequently refer points of law, which is based upon the Koran and its commentaries, to mollahs and mushteheds. The punishments commonly inflicted are fines, flogging (the bastinado) and death, either by decapitation, stabbing or torture. The principal hákim, or governors of provinces, are chosen, for the most part, from among the members of the royal family. As a rule, life and property are much more secure than is generally supposed. The revenue is derived from (1) a tax on the gross produce of land—25 per cent may be taken as the average assessment; (2) duties on cattle and flocks—in case of goats, sheep and cows, 8 per cent on value of wool and butter yielded; (3) customs dues; and (4) duties on provisions brought to market. It will thus be seen that the direct taxation falls almost exclusively on the land and its cultivators. In theory, these are the taxes authorized by the government, but in practice a frightful system of bribery and extortion prevails. The wealthy and influential escape the rapacity of the provincial governors, but as much as possible is taken from the hard-working peasants. It is believed that the irregular exactions amount to a sum equal to the legal assessments, and that not a penny of the money so extorted is applied to public purposes. The annual revenue in 1899–1900 may be stated at $7,500,000.

Elementary education is very generally diffused among all classes. There is a large number of colleges, where students are instructed in religion and Persian and Arabian literature. Among a considerable section of the upper classes it is asserted that the Mohammedan religion is losing its hold, and that unbelief is widely prevalent.

From the earliest times down to the present century Persia was divided into seven or eight great divisions, but about the time when it was attempted to introduce European civilization into the country and discipline into the army, the country was divided anew into 25 provinces. There are many interesting ruins of ancient, populous and celebrated cities in Persia; e.g., Persepolis and Istakhr, Rhages or Rhe, Shahpur, Tus, Shushan, Hamadan, Nishapur (the birthplace of Omar Khayyam), etc.

The Persian army, according to official returns of the Minister of War, numbers 105,500 men, of whom 5,000 form the artillery (20 batteries); 54,700 the infantry (78 battalions); 25,200 the cavalry, regular and irregular; and 7,200 militia (24 battalions). Of these troops, however, only about half are liable to be called for service, while the actual number embodied—that is, the standing army—does not exceed 24,500. The number liable to be called for service is as follows: Infantry, 35,400; irregular cavalry, but more or less drilled, 3,300; undrilled levies, 12,130; artillery, 2,500; camel artillery, 90; engineers, 100; total, 53,520. The organization of the army is by provinces, tribes, and districts, a province furnishing several, a tribe one or two, and a district one regiment.

The trade of Persia is comparatively of little importance. The silk used to be the great staple, and is produced in almost every province, but chiefly in Ghilan, Kashan and Yezd. The repeated failure of the crop has, however, interfered very seriously with this branch of industry. Cotton and woolen fabrics, shawls, carpets and felts are largely manufactured for use and export. Trade is carried on by caravans with the interior of Asia and the chief towns of Persia. The principal trade centers are Tabrîz, Teherân, Ispahân and Bushire. In recent time the communication between Persia and foreign countries has been greatly increased by way of the Caspian, owing to the development of the copious petroleum-wells at Baku. By means of the cheap fuel thus obtained the Russian commercial fleet on the Caspian has increased fourfold, and railways have been made from Batoum, on the Black Sea, to Baku, on the Caspian, and on other lines. The estimated value of the imports and exports for the year 1900–01 was about $45,000,000. Many projects of railways have been formed, but up to 1898 only one of them had been carried out—viz., from Teherân to Shah Abdul-azim, a place of pilgrimage distant only six miles. Tramways were laid down in Teherân, and an imperial bank was established, with branches in the other large towns, in 1889.

In January, 1895, the country was visited with a number of earthquake shocks of great severity. At Kuchan and other places the destruction of property and the mortality were immense. In one mosque six hundred persons, who sought refuge

there, were killed. The cold was intense, and many people perished from exposure. In August of the same year the entire city of Tabrîz rose in a bread riot against the governor, who was held responsible for a heavy rise in price. Many people were killed by the soldiers, but the suspension of the governor and fall in prices restored quiet.

PERSIAN ARCHITECTURE. See Vol. II, pp. 350–351.

PERSIAN BERRIES. See FRENCH BERRIES, in these Supplements.

PERSIAN CERAMICS. See POTTERY, Vol. XIX, pp. 639–642.

PERSIAN GULF. See ARABIA, Vol. II, pp. 207–208, 213.

PERSIAN INSCRIPTIONS. See PERSIA, Vol. XVIII, p. 667.

PERSIAN INSECT POWDER, a powerful insecticide prepared from a dried plant of the genus *Pyrethrum*, one of the *Compositæ*. The plant is largely cultivated in California, where large quantities of the powder are manufactured and exported.

PERSIAN LANGUAGE. See PERSIA, Vol. XVIII, pp. 665–668.

PERSIAN LITERATURE. See PERSIA, Vol. XVIII, pp. 665–673.

PERSONAL EQUATION OR ERROR. See TIME, Vol. XXIII, pp. 677–678.

PERSONALITY OR IDENTITY. See *Self*, under PSYCHOLOGY, Vol. XX, pp. 88–90.

PERSPECTIVE. See PROJECTION, Vol. XIX, pp. 826–829.

PERSPECTIVE PROJECTION. See GEOGRAPHY, Vol. X, pp. 180–183.

PERSPECTOGRAPH, a device for mechanically fixing the principal points of a perspective drawing. It consists of a frame with a hole for an eye-piece, and a pointer which is swung between the eye and the scene viewed. A piece of paper is used to record the points noted, as the pointer is brought opposite to them. In this way the main outlines of a drawing may be arranged in correct perspective.

PERSPIRATION OR SWEAT. See NUTRITION, Vol. XVII, p. 704.

PERTH AMBOY, a township and co-extensive city of Middlesex County, New Jersey, in the northeastern part of the state. It fronts on the Raritan River, Raritan Bay, and Staten Island Sound, and is reached by the Central of New Jersey and Pennsylvania railroads, and by ferry from Tottenville at the southern end of Staten Island. The Raritan River is spanned, at its mouth, by an enormous drawbridge, connecting Perth Amboy with South Amboy. The city is the center of a region rich in clay of superior quality, and is accordingly largely devoted to the manufacture of bricks, tiles, clay piping, etc., and has also cement works, iron foundries, machine shops, oil refineries, cigar factories, and many other establishments. Although distinctively an industrial and commercial city it is a favorite place of residence, a summer resort, and a yachting and fishing center. It has several public and private high schools, a public library, and a soldiers and sailors' monument. Its population in 1900 was 17,699. W.F.J.

PERTURBATIONS. See GRAVITATION, Vol. XI, pp. 65–67.

PERU, REPUBLIC OF. There has been a recent census, which is here given. Of the inhabitants 57 per cent are aborigines and 23 per cent are of mixed races. The republic is divided into 18 departments and 2 provinces (Callao and Moquegua), the area and population of which were reported as follows at the last census taken (in 1896):

DEPARTMENTS.	Area in Square Miles.	Population.
Piura	16,825	213,909
Cajamarca	12,538	442,412
Amazonas	13,943	70,676
Loreto	288,456	100,596
Libertad	10,206	250,931
Ancachs	16,562	428,703
Lima	13,300	298,106
Callao	14	48,118
Huancavelica	9,251	223,796
Huanuco	14,023	145,309
Junin	23,347	394,393
Ica	8,718	90,962
Ayacucho	18,185	302,469
Cuzco	156,270	438,646
Puno	41,198	537,345
Arequipa	21,947	229,007
Moquegua	5,547	42,694
Apurimac	8,187	177,387
Lambayeque	4,613	124,091
Tacna	12,590	50,449
Total	695,720	4,609,999

The carefully estimated total population in 1876 was 2,660,881. Total area, 695,733 square miles. Population of Lima, the capital (1900), 113,000.

There are besides, about 350,000 uncivilized Indians.

As a result of the war with Chile, the latter country has annexed the province of Tarapacá. The Chileans also occupy the department of Tacna for 14 years, after which a popular vote is to decide to which country it is to belong.

CONSTITUTION AND GOVERNMENT. The present constitution, proclaimed Oct. 15, 1856, was revised Nov. 25, 1860. It is modeled on that of the United States, the legislative power being vested in a Senate and a House of Representatives, the former composed of deputies of the provinces, in the proportion of one for every 30,000 inhabitants or fraction exceeding 15,000, and the latter of representatives nominated by the electoral colleges of the provinces of each department, at the rate of two when the department has two provinces, and one or more for every other two provinces. The parochial electoral colleges choose deputies to the provincial colleges, who in turn send representatives to Congress, and elect the municipal councils as well.

The executive power is intrusted to a President. There are two vice-presidents, who take the place of the president only in case of death or incapacity, and they are elected for four years.

The President has to exercise his executive functions through a cabinet of six ministers, holding office at his pleasure. None of the Presi-

dent's acts have any value without the signature of a minister.

Education and Religion. Elementary education is compulsory for both sexes, and is free in the public schools that are maintained by the municipalities. High-schools are maintained by the government in the capitals of the departments, and in some provinces pupils pay a moderate fee. There is in Lima a central university, called "Universidad de San Marcos," the most ancient in America; its charter was granted by the Emperor Carlos V; it has faculties of jurisprudence, medicine, political science, theology and applied science. Lima possesses a school of mines and civil engineering, created in 1874, with good collections and laboratories. There are in the capital and in some of the principal towns private high-schools under the direction of English, German and Italian staffs. Lima has also a public library with a rich collection, besides the one of the university and the school of mines. There are two minor universities at Cuzco and Arequipa.

By the terms of the constitution there exists absolute political but not religious freedom, the charter prohibiting the public exercise of any other religion than the Roman Catholic, which is declared the religion of the state. But practically there is a certain amount of tolerance, there being in Callao and Lima Anglican churches as well as Jewish synagogues. At the census of 1876 there were 5,087 Protestants, 498 Jews; other religions, besides Catholic, 27,073.

Finance. The budget for 1900 placed the total revenue at $7,061,639, and the expenditure at $6,959,985.

Peru had a considerable public debt, divided into internal and external. The internal liabilities (1901) were estimated officially at $20,442,330 (including floating and interest-bearing debt). The foreign debt was made up of two loans, contracted in England in 1870 and 1872, aggregating in 1889 $115,000,000.

No interest has been paid on the foreign debt of Peru (which was held chiefly in England) since 1876. An arrangement was made in 1885 with Chile by which a percentage of the guano deposits should be paid as interest to the bondholders, and a small amount was transmitted to England in 1883; but it was not till January, 1890, that the bondholders' claim was settled by an arrangement with the Chilean government securing certain guano deposits, the estimated value of which is $11,250,000. The interest arrears of Peru amounted in 1889 to $114,983,255. In January, 1890, what is known as the Grace-Donoughmore contract was finally ratified. By this the English council of foreign bondholders released Peru of all responsibility for the two loans on condition that the bondholders had ceded to them all the railways, mines, lands, and guano deposits of the state for 66 years. The bondholders undertake to extend the existing railways.

Defenses. The army of the republic is composed of six battalions of infantry, numbering 1,920 men; two regiments of cavalry, numbering 800 men; two brigades of artillery, numbering 600 men; total, 3,320 officers and men. There is also a police force of between 2,000 and 3,000 men.

The Peruvian navy now consists of four vessels —one cruiser, one steamer, and two despatch boats.

Commerce. The chief crops of the fertile valleys on the coast of Peru are sugar, cotton, wine, and coffee. The exportation of sugar amounted to 102,789 tons in 1899. This industry suffered much in 1889 on account of the disastrous war with Chile. Peruvian cotton is chiefly grown in the valleys of the Piura and Ica, and is a perennial. In 1899, the amount of cotton exported from Piura and Ica was 5,876 tons. The vine has been a profitable industry ever since the Spanish conquest, in several valleys on the coast, and also in the Sierra. Good wine is made at Pisco and Ica, and also a famous spirit from the grape, called *Pisco* and *Italia*. The yearly yield of wine is about 17,600,000 pints, and of spirits 5,280,000 pints. Rice of excellent quality is raised in the coast-valley of Lambayeque, and there are establishments for preparing it at Lambayeque and Ferreñafe. The yearly crop reaches 24,750,000 pounds. Olives are grown in the Tambo Valley near Arequipa; and before the Chilean War, mulberries, silkworms and cochineal were successfully cultivated. The rocky islets and barren deserts of the coast were once a source of enormous wealth to Peru, but are so no more. The exportation of guano from the Chincha Islands began in 1846 and ended in 1872, the supply being exhausted; and the nitrates of Tarapacá were seized and annexed by Chile, as the result of the war.

The staple exports of Peru are sugar, silver and wool. The silver-mines extend along the whole length of the Cordilleras, and are worked here and there, the great center of mining industry being at Cerro de Pasco. In 1898, the Cerro de Pasco mines produced 1,000,000 ounces of silver, and there are others of equal value around Puno, in the south of Peru. In the year 1900, the total value of the mineral produce exported was about $8,475,280. The number of mines in Peru is on the increase. There were 4,714 mining claims of all kinds reported in 1899.

Public Works. The system of railways consists of a dozen short lines in the coast-valleys—varying in length from twenty to eighty miles, constructed to bring the produce down to the seaports—and of two long lines across the Andes. The first of these, from Callao and Lima to Oroya, in the lofty valley of Jauja, is to be 136 miles long, and was commenced in 1870. It threads the intricate gorges of the Andes by a winding path along the edges of precipices, through tunnels, and over bridges that seem suspended in the air. It tunnels the Andes at an altitude of 15,645 feet, and the bridge of Verrugas spans a chasm 580 feet wide, on three piers, the center one being 252 feet high, of hollow wrought-iron. Of this railroad, 86¾ miles had in 1891 been completed, at a cost of $23,129,435. The other great line across the Andes connects

the port of Mollendo with Puno on the shores of Lake Titicaca, passing by Arequipa. The summit is crossed at a height of 14,660 feet, and the line is 346 miles long. Total railways, 850 miles.

HISTORY. In August, 1894, a revolutionary movement in opposition to President Caceres broke out, the chief leading spirit being Señor de Pierola, a former president. After a stubborn war, lasting nearly a year, President Caceres fled and took refuge on board a French man-of-war, and on July 10, 1895, General Pierola was elected President. In 1899 he was succeeded by Señor de Romano. Diplomatic relations between Peru and Chile, in consequence of the war, are suspended.

PERU, a city of La Salle County, northern central Illinois, at the head of navigation on the Illinois River, and at the terminus of the Illinois and Michigan Canal, 17 miles S. of Mendota, 100 miles W.S.W. of Chicago, and a mile below La Salle, with which it is connected by a car-line, on the Chicago, Rock Island and Pacific and the Chicago, Burlington and Quincy railroads. It is situated in a region in which coal is extensively mined, and has many important industries; among them, zinc-works employing 500 hands, large agricultural-implement factory, foundry, machine-shops, sawmills, breweries, flour-mills and manufactories of scales, pumps and boilers. The city is lighted by electricity; has two public parks, several churches, schools, a daily and weekly newspaper. Population 1890, 5,550; 1900, 6,863.

PERU, an important city and the county seat of Miami County, Indiana, in the north-central part of the state. It lies on the Wabash River, eighty-two miles north of Indianapolis, and is reached by the Lake Erie and Western and the Wabash railroads. The region about it is rich in agriculture, and the city has become an important center of commerce and manufactures. It has railroad car and engine shops, machine and furniture factories, woolen and glassware factories, vehicle factories, and a variety of other establishments, and is well equipped with schools, banks, churches and the other institutions of a city. Its population in 1900 was 8,463. W.F.J.

PERU BALSAM. See BALSAM, Vol. III, pp. 252, 253.

PERUGIA, LAKE OF. See ITALY, Vol. XIII, p. 449.

PERUVIAN ARCHITECTURE. See ARCHITECTURE, Vol. II, p. 395.

PERUVIAN BARK. See CINCHONA, Vol. V, pp. 682–683.

PERUVIAN INDIANS. See INDIANS, Vol. XII, pp. 868, 869; also PERU, Vol. XVIII, pp. 687, 688.

PESHITO OR PESHITTA. See SYRIAC LITERATURE, Vol, XXII, pp. 863, 864.

PESHTIGO, a village of Marinetta County, northeastern Wisconsin, on the navigable Peshtigo River, near Green Bay, 100 miles N.E. of Oshkosh, and on the Chicago and Northwestern railroad. It contains a large number of saw and planing mills, and has a trade in lumber. Population 1900, 4,228

PESTALOZZI. See EDUCATION, Vol. VII, p. 587.

PESTILENCE. See PLAGUE, Vol. XIX, pp. 169–179.

PETALISM. See OSTRACISM, Vol. XVIII, p. 65.

PETALS OF FLOWERS. See BOTANY, Vol. IV, pp. 119–121.

PETALUMA, a city in Sonoma County, northwestern California, on Petaluma Creek, at the head of navigation, 42 miles N.N.W. of San Francisco, with which it has communication by steamer, and by the San Francisco and Northern Pacific railroad. Its location, surroundings and equable climate have combined to make the city an attractive resort for tourists and strangers. It is also well adapted to the cultivation of grapes and other fruit, and the beautiful and fertile valleys of the vicinity are productive and highly cultivated. The city contains several churches, large graded-school buildings, high-school buildings, flouring-mills, planing-mills, sawmills, foundry, brewery, woolen-mill, two daily and three weekly newspapers, and superior warehouse facilities. Fruit, lumber, dairy products and cereals are the chief articles of export. Population 1890, 3,692; 1900, 3,871.

PETASITES. See HELIOTROPE, Vol. XI. p. 566.

PETCHORA, a river. See RUSSIA, Vol. XXI, p. 80.

PETECHIÆ OR HÆMORRHAGIC SPOTS. See PLAGUE, Vol. XIX, p. 170.

PETER, APOCRYPHAL BOOKS OF. See APOCALYPTIC LITERATURE, Vol. II, pp. 157, 158; and PETER, Vol. XVIII, pp. 709, 710.

PETERBORO, a village of Peterboro township, Hillsboro County, southern New Hampshire, on Contoocook River, 18 miles E. of Keene and 33 miles S.W. of Concord, and on the Fitchburg and the Boston and Maine railroads. It contains manufactories of cotton and woolen goods, shoes, thermometers, piano-stools, trusses, etc. Population of the town in 1890, 2,507; in 1900, 2,527.

PETERBOROUGH, Canada, the seat of Peterborough County, Ontario, a town and important junction of divisions of the Grand Trunk and the Canadian Pacific railroads, 78 miles northeast of Toronto. The town is well built upon the west bank of the Otonabee River, the route of the Trent Valley canal, and a handsome bridge connects it with Ashburnham. It is the receiving and distributing center of a productive farming region and has manufactures of flour, oatmeal, woolens, leather, bridge and iron work, etc. Population, 1891, 9,717; 1901, 11,239. C.L.S.

PETERLOO, MASSACRE OF. See MANCHESTER, Vol. XV, p. 472.

PETERMANN, AUGUST, a German geographer and cartographer; born at Bleicherode, April 18, 1822. From 1839–45 he assisted Berghaus in the edition of his *Physicalischer Atlas*, and in 1845, Keith Johnson in the English edition of the same work. In 1847 he founded a cartographical institute at London, when he pub-

lished *Physical Statistical Maps of the British Isles*, and contributed articles to the *Athenæum* and the ENCYCLOPÆDIA BRITANNICA. Returning home he, in 1855, founded *Mittheilungen aus Justus Perthes' Geographischer Anstalt.* Among his maps the six of the United States and the nine of Australia are the most famous. He was also a great promoter of African and Arctic explorations. He died from his own hand at Gotha, Sept. 25, 1878. G.A.S.

PETERS, CHRISTIAN FRIEDRICH AUGUST, a German astronomer; born in Hamburg, Germany, September 7, 1806. He was noted for his valuable investigations of the motions of the fixed stars; was long the editor of the *Astronomische Nachrichten* and director of the Altona Observatory. He published important papers on the parallaxes of the stars, the constant of nutation, etc. He died in Kiel, May 8, 1880.

PETERS, CHRISTIAN HENRY FREDERICK, astronomer; born in Coldenbüttel, Schleswig, Germany, Sept. 19, 1813; was graduated at the University of Berlin. In 1853 he removed to the United States. Through the influence of Edwin C. Litchfield, a wealthy alumnus of Hamilton College, he was appointed instructor of astronomy in that institution. In 1867 Mr. Litchfield endowed the chair of astronomy and the observatory with $30,000. Dr. Peters became well known through the expeditions which he conducted in the interest of astronomical science. In 1874 he led a body of experts to New Zealand to observe the transit of Venus. He catalogued 75,000 zodiacal stars and recorded 12,000 solar spots. He died July 20, 1890. G.J.H.

PETERS, KARL, the founder of German-East Africa; born at Neuhaus, Sept. 27, 1856. In 1884 he founded the Society for German Colonization, and led, in 1884–87, an expedition to East Africa, where he concluded a preliminary treaty with the Sultan of Zanzibar. In 1889–90 he was the leader of the expedition sent to the relief of Emin Pasha; reached the capital of Uganda, Sept. 26, 1890, and concluded a treaty with King Mwanga. In 1891 imperial commissioner; in 1895 captain-general of German-East Africa, and, in 1896, president of the German Society for Colonization, he was dismissed for alleged cruelties perpetrated on natives. He then went to London where he organized the *Peters' Estates and Exploration Company.* He wrote *Die Deutsche Emin-Pasha Expedition* (1891); *Das Deutsch-Ostafrikanische Schutzgebiet* (1895); *Waslehrt uns die Englische Colonial-Politik?* (1897); *The Colonial Power of England* (1904). G.A.S.

PETERS, SAMUEL ANDREW, an American clergyman; born in Hebron, Connecticut, Dec. 12, 1735. He is chiefly remembered for his satirical *History of Connecticut*, which through his proclivity for falsifying gave rise to widespread misconceptions regarding the Connecticut BLUE LAWS (q.v., in these Supplements), and is the "Parson Peter" of Trumbull's Hudibrastic political poem, *McFingal.* He died in New York, April 19, 1826.

PETERS, SAINT, old. See BASILICA, Vol, III, pp. 358–359. New; see ARCHITECTURE, Vol. II, p. 383.

PETERSBURG, a city and the county seat of Menard County Illinois, in the west-central part of the state. It lies on the south fork of the Sangamon River, nineteen miles north by west from Springfield, and is reached by the Chicago and Alton and the Jacksonville Southeastern railroads. It is a center of agriculture, coal-mining, and brick and tile manufacture, and had in 1900 a population of 2,807. W.F.J.

PETERSBURG, a town and the capital of Pike County, southwestern Indiana, near the White River, 20 miles S.E. of Vincennes and 44 miles N.N.E. of Evansville, on the Evansville and Terre Haute railroad. It is the center of a region producing coal, fire-clay, hardwood timber, live-stock, and has brick and tile works, flour and woolen mills and manufactories of lumber. Population 1890, 1,494; 1900, 1,751.

PETERSBURG, a city of Virginia, in 1890 the third city in size in the state. It has communication with other points by the navigable Appomattox River and by the Atlantic Coast Line and the Norfolk and Western railroads. It has numerous churches, high and lower grade public schools, and St. Paul's Female School, the Southern Female College and the Protestant Episcopal school for girls; libraries, state and national banks, water-works, electric lights, street-railways, one weekly, one semiweekly and three daily newspapers and a monthly periodical. The returns for 1900 showed 56 industries reporting in 225 establishments, with a combined capital of $3,960,987, employing 4,981 persons, to whom was paid $1,271,094, and having an annual product valued at $6,464,464. The city is the most important shipping-point for tobacco in the United States, having also a large export trade in cotton, flour and peanuts, and contains extensive tobacco warehouses and factories, cotton, silk, flour and paper mills, and manufactories of heavy machinery and agricultural implements. There are large granite quarries in the vicinity. Population 1900, 21,810. See also PETERSBURG, Vol. XVIII, p. 716; also UNITED STATES, Vol. XXIII, p. 818.

PETERSEN, HALLGRIM, a poet. See ICELAND, Vol. XII, p. 658.

PETERSEN, NIELS MATHIAS. See DENMARK, Vol. VII, p. 81.

PETERS-PENCE OR ROMESCOT, a tax for the benefit of the Pope; thought to have first been levied in England in 721 by Ina, King of Wessex. It was discontinued in 1365, and in 1534 Henry VIII had it prohibited by act of Parliament. Considering the value of money at that period, the levy—which was one penny for each family—was an enormous exaction, as a penny was the price of a day's labor. It has been revived as a voluntary contribution in several countries since the cessation of the temporal power of the popes, and has proven very successful. At the time of

the jubilee of Pius IX in 1877, the sum collected amounted to $3,300,000.

PETIGRU, James Lewis, statesman; born in Abbeville District, S. C., March 10, 1789; was graduated at the University of South Carolina in 1809, and admitted to the bar in 1812. He settled in Charleston, S. C., about 1815, and speedily rose to professional eminence. In 1822 he became attorney-general of the state. Throughout his career he gave his influence to the support of the National Government on the slavery question. Although he had large personal prestige, he made many enemies by his persistent opposition to the doctrine of nullification. In 1860, when war seemed inevitable, he earnestly pleaded in behalf of the Union, though in danger of personal injury. In 1861 he removed to Summerville, S. C., and about the same time was elected to the legislature. He died in Charleston, S. C., March 3, 1863. G.J.H.

PETIOLE. See Botany, Vol. IV, pp. 101, 102.

PETION, Alexandre (1770–1818). See Hayti, Vol. XI, p. 487.

PETIT DE JULLEVILLE, Louis, historian; born in Paris, France, July 18, 1841. After receiving his education he was chosen professor of French literature in the Sorbonne. His chief publication is entitled *History of the Theater in France*. It is composed of five volumes and largely treats of the old French theater. In another work, entitled *The Theater in France*, he traces the evolution of the French drama down to 1889. He died in Paris, Aug. 28, 1900. G.J.H.

PETITE ANSE, an island of Iberia parish, Louisiana, containing a remarkable deposit of rock-salt, which was mined by the Confederates in 1862. The work was carried to a depth of 75 feet, but was broken up by the Union forces in 1863. Work has been resumed in recent years.

PETITION OF RIGHT. See Petition, Vol. XVIII, pp. 717–718.

PETO, Sir Samuel Morton, an English railroad constructor and engineer; born in Woking, England, Aug. 4, 1809. He constructed a large portion of the leading railway works in England, and was engaged in the formation of a large railway in Canada. Among his most important works were the Norwegian Grand Trunk line and the Royal Danish line. Toward the close of 1854 he undertook, without prospect of profit, the construction of a railway from Balaklava, in the Crimea. He was returned as one of the members in the advanced Liberal interest for Norwich in August, 1847, and again at the general election in July, 1852, and retired in December, 1854. He was elected one of the members for Finsbury in April, 1859, and at the general election in July, 1865, exchanged his seat for Bristol, but retired from Parliament in April, 1868, in consequence of the bankruptcy of the firm of Peto, Betts and Crampton, with liabilities of above thirty-five million dollars. He died Nov. 13, 1889.

PETOFI, Alexander, a Hungarian poet and patriot (1822–49). See Hungary, Vol. XII, p. 393.

PETOSKEY, a village of Emmet County, northern part of the southern peninsula of Michigan, on Little Traverse Bay, an arm of Lake Michigan, 60 miles N N.E. of Traverse City, and on the Chicago and West Michigan and the Grand Rapids and Indiana railroads, with steamer communication with lake ports. It has a good water-power from Bear River; manufactures lumber and lime, flour, pulp and handles, and ships lime, maple-sugar and large quantities of fish. Petoskey is a fashionable watering-place and resort for sufferers from asthma and hay-fever. Population 1890, 2,872; 1900, 5,285.

PETRI, Laurentius and Olaus, brothers. See Sweden, Vol. XXII, p. 792.

PETRIE, William Matthew Flinders, archæologist; born in England, June 3, 1853. He began his work as an archæologist by his study and measurements of the prehistoric monuments in Great Britain. Later he carried on exploration in the Delta, and there discovered and exhumed the ancient Græco-Egyptian city of Naukratis. He also investigated the interior of the Illahun and Hawara pyramids. In 1894 he carried on excavations on the ancient site of Koptos, which resulted in the discovery of six successive temples, reaching from the most remote prehistoric time to the age of the Ptolemys. Moreover, these excavations resulted in the recovery of a great number of objects and memorials belonging to the thirty-four different rulers of Egypt. In the lowest temple at Koptos, Petrie found the remains of an ancient settlement which for the first time revealed prehistoric Egypt. In 1903 he began excavations at Abydos, and at a depth of twenty feet discovered ten successive temples, ranging from 500 to about 5000 B.C., which thus made it possible to see the whole of Egyptian history from age to age. There was also found an ivory statuette of Cheops of the finest work, showing for the first time the face and character of the great Egyptian builder. Dr. Petrie's publications include *Stonehenge Plans, etc.; Pyramids and Temples of Gizeh; Tanis; Ten Years' Digging; A History of Egypt during the Seventeenth and Eighteenth Dynasties; Egyptian Decorative Art*, etc. G.J.H.

PETRIFACTIONS. See Mineralogy, Vol. XVI, p. 386.

PETROGRAPHY, etymologically, is a description of rocks, but it is so difficult to describe rocks without reference to their structure and geological relations, that specialists are using the term as a branch of geology which has for its object the study of the texture, mineralogical composition and other physical characters of rocks. It is an indoor rather than an outdoor study. See *Physical Properties of Minerals*, under Mineralogy, Vol. XVI, pp. 387–395.

PETROLEUM V. NASBY, the pseudonym of Locke, David Ross, q. v., in these Supplements.

PETROMYZONTIDÆ. See Lamprey, Vol. XIV, p. 250.

PETROSSA TREASURE. See Plate, Vol. XIX, pp. 193, 198.

PETRUCCI FAMILY. See SIENA, Vol. XXII, pp. 47, 48.

PETSH OR IPEK, a pleasant town of European Turkey, in Albania. It stands on the Bistritza, or White Drin, 73 miles E.N.E. of Scutari. Population about twelve thousand, mostly Turks.

PETTENKOFEN, AUGUST VON, an Austrian military and genre painter; born in Vienna in 1823; in 1866 became a member of the Vienna academy, and in 1867 of the Munich academy. His pictures, which generally relate to episodes in peasant-life and the soldier's career in Hungary, are painted with an exactness and truth which manifest not only large genius but an intimate knowledge—based upon his early soldier-life. He was knighted in 1876. Among his works are *After the Duel*, and *Hungarian Peasants Halt*, in the Fedor Museum, Amsterdam; *A Rendezvous*, in the Vienna Museum.

PETTENKOFER, MAX VON, a German chemist; born in Lichtenheim, Dec. 3, 1818; became professor of chemistry at Munich in 1847, and professor of hygiene in a Bavarian University in 1865. Among numerous valuable discoveries that he made are a process of obtaining illuminating gas from wood, and the characteristics of oil-colors. His researches into the factors of the dissemination of cholera have been borne out by recent experience. He was one of the editors of *Zeitschrift für Biologie* (1865–82), and among other works are *Ueber die Verlegung der Göttesäcker*, in Basel (1864); *Zum Gegenwärtigen Stand der Cholerafrage* (Leipsic, 1877). Died in 1901.

PETTIE, JOHN, a Scotch painter; born in Edinburgh, March 17, 1839; noted for his lifelike scenes of old English life; became a royal academician in 1873, in place of Landseer. Many of his works have been engraved. Among his noted works are *The Drum-Head Court-Martial; Arrest for Witchcraft; The Disgrace of Cardinal Wolsey;* and *Jacobites, 1745*. Died in Hastings, Feb. 21, 1893.

PETTIGREW, JAMES BELL, a Scotch surgeon and anatomist; born in Roxhill, May 31, 1834. He contributed the article FLIGHT, FLYING-MACHINES, in this ENCYCLOPÆDIA, Vol. IX, pp. 268–284, and of many valuable works on anatomy and other sciences. He is especially famous for his elaborate and intricate investigations in anatomy. He was elected president of the Royal Medical Society in 1860, and was the recipient of many other honors. Among his numerous important works are *The Valves of the Vascular Systems in Vertebrata* (1864); and *The Muscular Arrangements of the Bladder and Prostate* (1867).

PETTIGREW, RICHARD FRANKLIN, an American public man; born in Ludlow, Vermont, July, 1848. He removed with his parents to Evansville, Rock County, Wisconsin, in 1854; was prepared for college at the Evansville Academy, and entered Beloit College in 1866, where he remained two years; was a member of the law class of 1869, University of Wisconsin; went to Dakota in July, 1869, in the employ of a United States deputy as a laborer; located in Sioux Falls, where he engaged in the surveying and real-estate business; opened a law office in 1875; was elected to the Dakota legislature as a member of the council in 1877, and re-elected in 1879; was elected to Congress in 1881 as a delegate from Dakota Territory; to the territorial council in 1884; United States Senator, under the provisions of the act of Congress admitting South Dakota into the Union (1889–95), and again in 1895.

PETUNIA, a South American variety of the nightshade family. See HORTICULTURE, Vol. XII, p. 273.

PEWEE. See PHŒBE-BIRD, in these Supplements.

PEWS. See ARCHITECTURE, Vol. II, p. 413.

PEXOS, a mountain. See CANARY ISLANDS, Vol. IV, p. 706.

PEYER'S GLANDS. See DIGESTIVE ORGANS, Vol. VII, pp. 197–198.

PEYTON, JOHN LEWIS, an American lawyer; born in Montgomery Hall, Augusta County, Virginia, Sept. 15, 1824; received a military and classical education at Virginia Military Academy, and graduated at the law department of the University of Virginia in 1845. In 1851 he was sent by the government on special service to England, France and Austria. Returning in 1853, he resided in Chicago, where he attained great eminence at the Chicago bar. He returned to Virginia in 1856; raised a company for the Confederate cause in 1861; and broke the Charleston blockade in the Confederate man-of-war, *Nashville*. Went to Europe in 1861 as agent of North Carolina to England and France, and conferred with many leading European statesmen. He wrote *A Statistical Review of the State of Illinois* (1854); *The American Crisis* (1866); *Tom Swindel: or, The Adventures of a Boomer* (1893); and a number of other works.

PFLEIDERER, OTTO, a German Protestant theologian; born in Stettin, Sept. 1, 1839. Studied under Baur, at Tübingen, from 1857 till 1861, and next paid a visit of study to England and Scotland; became pastor at Heilbronn in 1868, and superintendent at Jena in 1870, an office which in the same year he exchanged for the chair of theology there. In 1875 he was called to be professor of systematic theology at Berlin. His works are numerous, and may not be ignored by any serious student of philosophy or theology. The latest published are *The Influence of the Apostle Paul on the Development of Christianity* (1885); and *The Development of Theology since Kant* (1890).

PHACOCHŒRUS, OR WART-HOG. See SWINE, Vol. XXII, pp. 812, 813.

PHÆDRA. See THESEUS, Vol. XXIII, 315.

PHAËTONIDÆ. See TROPIC-BIRD, Vol. XXIII, p. 625.

PHAGEDÆNA. See VACCINATION, Vol. XXIV, p. 31.

PHAGOCYTES (Gr., *phagein*, to eat, *kutos*, cavity), the white globules in the blood that possess the property of destroying microbes. These globules or leucocytes attack the noxious proper-

ties of the pathogenic microbes and seek to destroy and eliminate them from the system. It is understood that when any septic element penetrates any part of the body, the battle begins by the leucocytes dissolving the bacteria. W.R.B.

PHALANGIDEA. See ARACHNIDA, Vol. II, pp. 243–245.

PHALANGISTIDÆ. See MAMMALIA, Vol. XV, pp. 384, 385.

PHALANX. See ARMY, Vol. II, pp. 485, 486.

PHALARIS, EPISTLES OF. See PHALARIS, Vol. XVIII, p. 744.

PHALAROPE. See SAND-PIPER, Vol. XXI, p. 272.

PHALLIC WORSHIP, a practice or custom which originated in a reverence for the generative or reproductive powers of nature, and became debased among semicivilized and ancient people into an adoration of a figure of the phallus or male organ of generation. This practice has prevailed in India in recent times; also among some of the Australasian tribes. It prevailed in Phrygia, Chaldæa, Syria, Egypt, Greece and Rome. Priapus, Pan, Hermes and other gods were worshiped in Rome and Greece through a symbolism of the phallus. See PRIAPUS, Vol. XIX, p. 740.

PHANARIOTS. See GREECE, Vol. XI, pp. 111, 112.

PHANEROGAMIA. See VEGETABLE KINGDOM, Vol. XXIV, pp. 142, 143.

PHARANGOBRANCHII, same as LEPTOCARDII. See ICHTHYOLOGY, Vol. XII, p. 733.

PHARAOH'S RAT. See ICHNEUMON, Vol. XII, p. 665.

PHARMACY. (For a general treatment of the subject, see PHARMACOPÆIA, Vol. XVIII, pp. 744–745.) In the United States the *Pharmacopœia* is, in certain states, issued under the requirement of special law, instead of being under the authority of the general government, as in many European states. What is known as the seventh decennial revision of the *Pharmacopœia* was prepared by a convention of pharmacists, which met in Washington in 1890. It is known as the *Pharmacopœia of the United States of America;* was printed at Philadelphia; became official Jan. 1, 1894; and contains modes of preparing and descriptions of drugs, useful information, formulæ, etc. No country has done more to elevate the standard of pharmacy than the United States. There are numerous schools and colleges of pharmacy—some separate and others in connection with prominent universities—where the student is instructed not merely in chemistry, materia medica and botany, but in physics, animal physiology, toxicology and pharmacology. The Philadelphia College of Pharmacy and the School of Pharmacy of the University of Michigan are good examples. In some states it is required of the applicant for a certificate of pharmacy that he be a graduate of an acknowledged school; in others he must pass an examination before a state board of pharmacy.

PHAROS. See ALEXANDRIA, Vol. I, p. 436.

PHARPAR, a river. See ABANA, Vol. I, p. 12.

PHARSALOS, now FERSALA, anciently a town of Thessaly, about 20 miles S. of Larissa, on the River Enipeus, a branch of the Peneus (now the Salambria), and historically notable mainly for the great battle fought here between Cæsar and Pompey, Aug. 9, 48 B.C. It is now the seat of the episcopal palace and the Metropolitan Church.

PHARYNX. See ANATOMY, Vol. I, p. 735.

PHASCOGALE. See MAMMALIA, Vol. XV, pp. 383, 384.

PHASCOLOMYIDÆ. See MAMMALIA, Vol. XV, p. 386.

PHASEOLUS, a genus. See GRAM, Vol. XI, pp. 33, 34; also HORTICULTURE, Vol. XII, p. 295.

PHASIANIDÆ. See POULTRY, Vol. XIX, p. 664.

PHASIS, now called RION, a river. See CAUCASUS, Vol. V, p. 221.

PHEASANT'S-EYE, a plant. See ADONIS, Vol. I, p. 148; also HORTICULTURE, Vol. XII, p. 265.

PHEASANT-SHELL, a name which collectors apply to the bright-colored shells of the gasteropod mollusk, *Phasianella*, which belongs to the family of top-shells (*Trochidæ*). They are found near the shores of tropical seas, especially in Australia.

PHELPS, a village of Ontario County, western central New York, 8 miles N.W. of Geneva, on the New York Central and Hudson River and the Lehigh Valley railroads. It contains important manufactories of machinery, malt, peppermint and other essential oils, and has valuable deposits of gypsum. The village was founded by Oliver Phelps, born in Windsor, Connecticut, in 1749; died in Canandaigua, New York, Feb. 21, 1809. Mr Phelps received large grants of land in western New York; opened at Canandaigua what is said to have been the first land-office in America; invented the system of townships and ranges now in use by government surveyors; was active as a promoter of the Erie and Welland canals; with several other men purchased in northern Ohio a large tract of land known as the "Western Reserve"; and during his career held many positions of trust. Population 1900, 1,306.

PHELPS, AUSTIN, an American clergyman and author; born in West Brookfield, Mass., Jan. 7, 1820. He was graduated from the University of Pennsylvania in 1837. In 1849 became professor of sacred rhetoric in the Andover Seminary, and from 1869 to 1879 he was president of the institution. His writings include: *The Still Hour* (1859); *The New Birth* (1867); *Studies of the Old Testament* (1879); *Theory and Practice of Teaching* (1881); *Men and Books* (1882); *English Style in Public Discourse* (1883); *My Study, and Other Essays* (1885); *My Note Book* (1889). Died in Bar Harbor, Me., Oct. 13, 1890. W.M.C.

PHELPS, ELIZABETH STUART, author; born at Andover, Mass., Aug. 13, 1815; daughter of Rev. Moses Stuart, an able theological writer, whose intellectual alertness she inherited. In

1842 she married Rev. Austin Phelps, resided four years in Boston, where Mr. Phelps was pastor of a Congregational church, and spent the remainder of her short life in her native town. She was the author of a number of moral tales which were very popular, her *Sunnyside*, a description of life in a country parsonage, selling over 100,000 copies. Her books were vivacious in style, with a delicate humor, their scenes being laid mostly in New England. Others of her works were *Kitty Brown; A Peep at Number Five; The Tell Tale; The Angel over the Right Shoulder; Last Leaf from Sunnyside*, etc. Her daughter inherited her literary facility. She died in Boston, Nov. 30, 1852. G.J.H.

PHELPS, Edward John, an American lawyer and public man; born in Middlebury, Vt., July 11, 1822. He graduated at Middlebury College in 1840; studied law, and was admitted to the Vermont bar in 1843. He removed to Burlington, Vt., in 1845; was second comptroller of the United States Treasury, 1851–53; delegate to the Vermont constitutional convention, 1870; president of the American Bar Association, 1880; professor of law at Yale, 1881–85; minister to Great Britain, 1885–89; one of the United States counsel in the Bering Sea arbitration, 1893; and, later, Kent professor of law at Yale. He died in New Haven, March 9, 1900. E.E.T.

EDW. J. PHELPS.

PHELPS, John Wolcott, an American soldier; born in Guilford, Vt., Nov. 13, 1813. He was graduated from the United States Military Academy in 1836; served in the Creek and Seminole wars and in the Mexican War. In 1859 he resigned from the army but enlisted in 1861 as colonel of the 1st Vermont volunteers. He occupied New Orleans in May, 1862, issuing a proclamation against slavery, which resulted in a quarrel with Gen. Butler. At Camp Parapet, near New Orleans, he organized the first negro troops in 1862. In August, 1862, he was declared an outlaw by the Confederate government for having "organized and armed negro slaves." In 1863 he was elected vice-president of the Vermont Historical Society, and in 1880 was nominated for President by the American, or anti-Masonic, party. He published *History of Madagascar* (1884). He died in Brattleborough, Vt., Feb. 2, 1885. W.M.C.

PHELPS, William Walter, an American public man; born in New York, Aug. 24, 1839. He graduated at Yale in 1860, and at Columbia College Law School in 1863. He retired from the practice of law in 1868; was a Representative in Congress from New Jersey from Dec. 1, 1873, to March 3, 1875, and again from Dec. 3, 1883, to March 3, 1889; delegate to the national Republican conventions of 1880 and 1884; and minister to Austria, 1881–82. He was appointed by President Harrison in 1889 to be one of the commissioners to represent the United States at the International Congress on the Samoan question which met at Berlin; was minister to Germany till 1893; and later a special judge of the court of errors and appeals of New Jersey. He died in Teaneck, New Jersey, June 17, 1894. E.E.T.

PHENACETINE, a derivative of acetanilide or antifebrine, which it resembles in its medical properties, and is accordingly used as an antipyretic and analgesic.

PHENIC ACID AND PHENOL, same as Carbolic Acid, Vol. V, p. 76.

PHENICINE OR PHENICIENNE. See Carbolic Acid, Vol. V, p. 76.

PHENIX, a village of Kent County, central Rhode Island, 14 miles S.W. of Providence, on the Pawtuxet River, and on the New York, New Haven and Hartford railroad. It has manufactories of cotton goods and machinery. Estimated population 1900, 1,500.

PHENOL COLORS. See CARBOLIC ACID, Vol. V, p. 76.

PHENOLS, aromatic hydroxides, though the name is often given to the simplest phenol, carbolic acid in common parlance. This was discovered by Runge in 1834, in coal-tar, from which it is still obtained. It is a white, crystalline solid, turns red on exposure to air, has a characteristic smell and taste, is somewhat soluble in water but more easily in alcohol, is poisonous, is a good antiseptic, and is used as such in medicine. It is also used to preserve timber, to make picric acid, etc. See Chemistry, Vol. V, p. 189.

PHENYLAMINE. See Aniline, Vol. II, p. 43.

PHERÆ. An old name for the town of Kalamata, q. v., Vol. XIII, p. 835.

PHIGALIAN MARBLES. See Phygalia, Vol. XVIII, p. 749.

PHILADELPHIA. Since the article on Philadelphia—see Vol. XVIII, pp. 750–755—was published in this Encyclopædia, the city has passed under a new form of municipal government. The present government charter was created by what is known as the "Bullitt Act," 1885, and is a distinct effort to solve the problem of city government by concentrating the power in the hands of an executive who should appoint his chief subordinates and be able to hold them responsible for the manner in which they executed their duties. Prior to this time, the functions of the mayor were chiefly clerical, and those of a director of police. Under the Bullitt Act, the public, municipal business is divided into three departments: one of public safety, which has control of the police, fire and electrical organizations, health, building-inspection and municipal property, and boiler-inspection; the department of public works has supervision of gas, railways, street-cleaning and lighting, surveys and water-supply; the department of charities and correction is under a president and four directors. The mayor appoints the chiefs of all these departments, and they are re-

sponsible to him for the efficiency of their subordinates.

The receiver of taxes and the city solicitor are chosen in the spring, for a term of three years. The city treasurer and city comptroller are county officers, elected in the autumn, for three years—a distinction being made between the county and municipal governments. Under the new system the only conspicuous official malfeasance has been in the office of city treasurer, under whom in 1891 an embezzlement of $1,500,000 took place, for which he suffered an imprisonment of five years, being pardoned out in 1896.

Under the new charter there has been a marked improvement in public administration. The mayors have been selected with more care; there has been less room for political "log-rolling," and in the difficult problem of American municipal government

STATE HOUSE, PHILADELPHIA, IN 1775.

Philadelphia has become a type of efficiency and probity. The board of education, which has a sort of supervision over the 37 ward or sectional boards of school directors, is still appointed by the court of common pleas, one member being appointed for each of the different city wards. The sinking-fund and park commissions are controlled by boards, one of whom is the mayor, *ex officio*. The Public-Building Commission is an independent organization, created by the legislature in 1870 for the sole purpose of erecting the expensive and long unfinished city hall. It is free from the control of the councils, and practically without amenability to any authority.

The city and common councils are charged with the legislation of the city. There is one select-councilman for each of the 37 wards, who holds office for three years. There is one common-councilman for every two thousand names on the canvassers' lists at the time the election is held. There are 12 judges of the district-court, as the county court in Philadelphia is termed; four judges of the orphans' court, who perform the functions of surrogate and probate judges; and 28 police magistrates. The city is entitled to 8 members of the state senate, 39 members of the state house of representatives, and five members of the House of Representatives in Congress.

Under the operation of the Brooks Law regulating the sale of intoxicating drinks (see LIQUOR LAWS, in these Supplements), there has been a great diminution in the number of arrests for disorderly conduct and other crimes growing out of intoxication. The sale of liquor after midnight and on Sunday is as thoroughly suppressed as such offenses can be under a democratic form of government. There are no recognized evasions of the law, and during prohibited hours it is almost impossible to obtain liquor.

LIBERTY BELL.

FINANCES. In 1894 the city debt amounted to $54,275,444, which was offset by securities in the sinking-fund of $24,830,363 and by other assets, such as cash on hand and outstanding taxes, amounting to $11,196,198. For the balance, the city has improved and other real estate appraised at about $46,000,000. The assessed valuation of the city for tax purposes is estimated at two-thirds of the actual value, and amounts to $780,000,000, on which the tax-rate for many years has been 1.85 per cent. The receipts of the city from all sources were (1895), in round numbers, $31,000,000, and the expenditures $28,500,000

There are 44 banks in the city, of which three are under state charters, having a capital of $24,000,000 and deposits of $120,000,000. In addition, 42 trust companies, with a capital of $30,000,000 and deposits of nearly $70,000,000, do a large business on collateral stock and bond loans. The $53,000,000 deposited in the four savings banks represent but a small part of the prudential savings of the people. The function performed by savings banks in New England is very largely replaced in Philadelphia by the building and loan associations, which had their origin in the United States in this city. There are 450 of them in Philadelphia, in annual receipt of more than five millions of dollars and holding in unliquidated bonds and mortgages over forty millions of dollars. The usual term for the expiration of a series in one of these building associations is 11 years and 5 months, but as each year they make a new series they are practically perpetual-loan companies. A very large part of the city has been built up within the last fifty years through the operations of these companies, which loan only to their own members and invest chiefly in real-estate securities offered by the borrowers. The operation of these societies will explain the vast proportion of small dwellings and the ownership by their occupiers which characterizes this city.

MANUFACTURES. Until the census of 1890 Philadelphia claimed pre-eminence over all the cities of the Union for the variety and number of its manufacturing establishments, and for the value of their output. That census transferred the pre-eminence to New York, and the condition remains the same. According to the returns for 1900 there were 15,887 manufacturing establishments, having a direct

investment of $476,529,407, and hiring much valuable property. The aggregate number of employees was 264,507, in round numbers, to whom was paid $132,001,912 in wages. The value of the products placed upon the market was $603,466,526.

The chief of these industries, in the order of the products, were: Sugar and molasses, $36,163,817; clothing, $36,214,053; foundries and machine-shops, $38,372,971; printing and publishing, $23,508,875; carpets and rugs, $21,986,062; woolens, $18,340,012; carpentering, $21,751,145; slaughtering and meat-packing, $12,020,462; hosiery and knit-goods, $13,040,905; worsted goods, $16,242,250; leather tanning, etc., $18,187,231; boots and shoes, $7,611,612; cotton fabrics, $15,723,654; malt liquors, $12,606,551; chemicals, $7,810,456; iron and steel, $7,208,948; tobacco goods, $8,990,595; patent medicines, etc., $3,013,034; silk, $4,531,794; painting and paper-hanging, $7,230,597; plumbing and plumbing-supplies, $7,167,158; umbrellas and canes, $3,145,446; paints, $5,923,920; confectionery, $6,000,815; furniture, $6,322,197; lumber-mill products, $3,200,142.

Experts estimate that the increase of manufactures, and of capital and of employees engaged in them, has been thirty per cent in the five years following the census.

A wider renown has undoubtedly come to Philadelphia from the construction of steamships on the Delaware than from any other single industry. This is due not only to the extent of the tonnage built, but to the superb technical achievements of the Cramps. Their yard is located on the Delaware River, in the old Kensington district. The works were founded in 1830, since which time 300 ships have been built. A number of these are the cruisers of the United States navy, as the *Newark*, *New York*, and *Philadelphia*, and the battle-ship *Indiana*, completed in 1896. Here, too, were constructed the *St. Louis* and *St. Paul* for the International Navigation Company, an American line chiefly owned in Philadelphia, but the vessels plying between New York and Southampton. These vessels have a measurement of 11,000 tons and develop 19,000 horse-power.

COMMUNICATIONS. The Delaware and Raritan canal, having fallen under the control of the Pennsylvania Railroad Company, has become simply a financial auxiliary to its interests. By steam navigation Philadelphia has communication with the towns on the Delaware from Trenton to Cape May, and through the Delaware ship-canal to Baltimore and the Chesapeake waters. Surveys have been made at a cost of $100,000 to the city for a ship-canal across New Jersey to Newark Bay, having a capacity to pass through it modern vessels of large tonnage, and if the general government will assist, capacity for its cruisers and battle-ships. Should the Delaware ship-canal be enlarged to similar proportions, it would be possible to concentrate men-of-war at any point from Norfolk to New York harbor without going to sea.

The harbor itself has recently been greatly improved, partly at the expense of the United States government and partly that of the city. The two islands that lay in the river opposite Camden, known as Ridgeway Park and Windmill islands, were entirely dredged away in 1894. The city appropriated $500,000 for improving the channel in the lower reaches of the river, and $150,000 for widening Delaware Avenue, which is the street on the Delaware River front. In addition to this, $1,000,000 from the Girard estate was available for this purpose. It is proposed to extend the wharf-line of the city, and also to improve the Camden front, so as to reduce the width of the river from half a mile to 1,900 feet. The currents of the river thus contracted would maintain a depth of 26 feet at low tide. It is estimated that 25,000,000 cubic yards of material will need to be dredged away, at a cost of $3,500,000, of which, in 1896, one third had been removed.

CITY HALL, PHILADELPHIA.

Entrance by railroad into the city is now practically confined to the four great systems, the Pennsylvania, the Reading, the Baltimore and Ohio, and the Lehigh Valley, which have absorbed all the other lines. The passage of the Baltimore and Ohio trains is through depressed ways along the banks of the Schuylkill. The Pennsylvania and Reading lines reach the heart of the city in Market Street, near Broad, on elevated causeways of masonry and iron. Their terminal depots are buildings of high architectural beauty and most convenient and sumptuous in their appointments. The station of the Pennsylvania Company confronts the new city hall, has a granite basement story and a superstructure of ten stories in brick, with terra-cotta trimmings, and is a fine adaptation of the Gothic to modern needs. It has a frontage of 306 feet, while the train-shed is 600 feet long and spans a clear distance of 304 feet. The area covered by the shed is about five acres, and 16 tracks enter it side by side. The Reading terminal at Twelfth and Market streets is built of New England granite up to the second floor, above which rise seven stories constructed of pink-tinted brick and white terra-cotta embellishment. In style it is a composite Rennaissance. The train-shed is 507 feet in length and 266 feet wide, covered by a roof of a single span.

Hotels. The somber monotony of Philadelphia buildings began to be changed rapidly at the time of the Centennial Exposition in 1876, and a new appreciation of architectural beauty has controlled recent constructions. In nothing is this more evident than in the new hotels, which show a decided tendency to locate themselves near the center of Broad Street. To the long-renowned Continental Hotel, the Girard House and Bingham's, have been added the Colonnade, of white marble, at the corner of Chestnut and Broad; the Lafayette, in its rear, which was enlarged, renovated and reopened in 1896; the Stratford, still farther south; and the Walton, of brownstone and red brick, opened in February, 1896. These hotels are distinguished for their quiet sumptuousness and elegance and the excellence of their interior decorations.

Water-Supply. The water-supply of the city is still drawn almost wholly from the Schuylkill River. There are supplementary reservoirs of large dimensions for high service at East Park, Mt. Airy and Roxborough. These, with ten other reservoirs, have a total capacity of 1,017,250,000 gallons.

Streets. With considerable rapidity the old cobblestone pavements are disappearing from the denser part of the city, and are not extended into the new part. There are 13,000 miles of streets laid out, of which 80 are paved with asphalt, 50 with vitrified brick and 220 with Belgian blocks. Nearly every thoroughfare of importance in the city is traversed by lines of trolley-cars. Since 1890 all the traction cable-roads have been converted into the new electric system, and the old horse-cars have entirely disappeared. The various systems of street passenger traffic were consolidated into one in 1895, the capitalization of which is over $100,000,000. By a system of exchange tickets, for the purchase of which 3 cents is added to the regular fare of 5 cents, one can be transported to any part of the city and may ride a distance of 14 miles. In January of 1896 the drivers and conductors of this great system struck for ten hours' work, a pay of two dollars a day, and to resist the dismissal of union men without cause. The strike was accompanied with some rioting near the car-stables and in the thoroughfares of Chestnut and Market streets, which confined itself to the destruction of cars. For several days street traffic was entirely arrested, but through the intervention of a committe of citizens a compromise was brought about and the old men were taken back, except in so far as their places had already been supplied by new men.

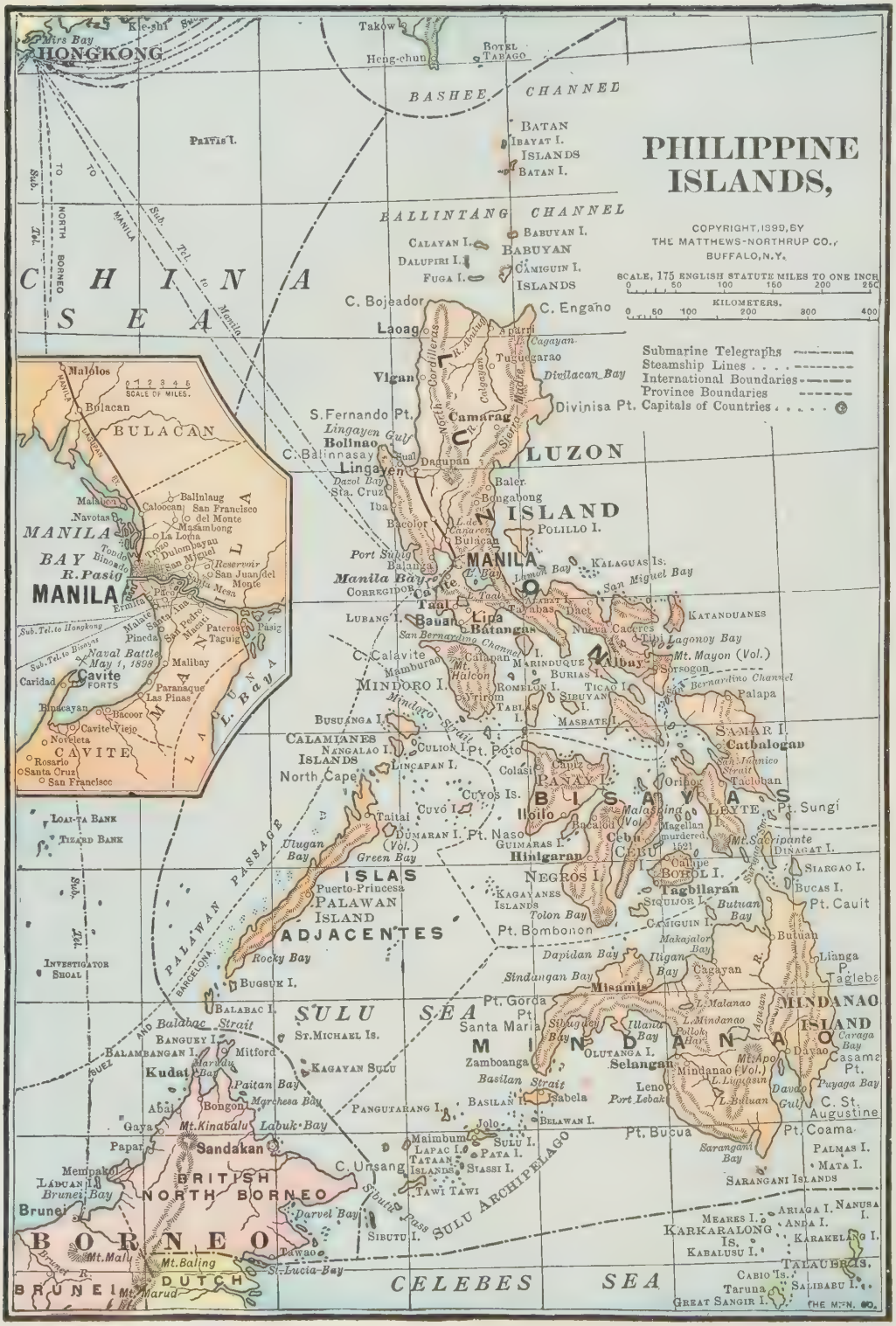
Schools. In 1895 there were 425 public schools in the city, with 3,161 teachers and an enrollment of 163,707 pupils. The school system was maintained that year at an expense of $3,965,571. There are four high-schools, of which two are for girls and two for boys. One of the girls' high-schools is a normal school. Both are fine and massive structures, capable of accommodating 1,200 pupils. Both are on Spring Garden Street, about four squares apart. The Central High School for lads, at the corner of Broad and Green, long occupied a large brick structure, but in 1896 a substantial and handsome building was in process of erection opposite the old structure. Another graduating-school for boys is known as the Manual Training School, where technical instruction in wood and iron work is given in connection with a curriculum quite as extensive as that of the Central High School, which, with the exception of languages, is intended to be the equivalent of an ordinary collegiate course.

The school administration is a dual system; each ward elects 12 directors or trustees, who have control of the engagement of teachers and questions of discipline. Over them all is a board of education, appointed by the judges of the court already mentioned. This board makes appropriations for the erection of school-buildings and assigns their location, purchases the school-books, and has an advisory relation with the ward or sectional directors. In 1883 this board called to the service of the city James McAllister, of Milwaukee, who succeeded in giving unity to the administration and introducing the system of manual training. Upon his retirement his methods still remained prevalent throughout the system, and the schools of Philadelphia have now become typical for their methods and excellence.

Among the additions of private philanthropy to the educational features of Philadelphia must be noted the Williamson Trade School, resting upon a foundation of $5,000,000 provided by I. V. Williamson. It is located near Media, in Delaware County, but its control is in Philadelphia and its facilities are offered freely to the children of that city. Of more note is the Drexel Institute, in West Philadelphia, near the Schuylkill River, founded by the banker Anthony J. Drexel. The building has a fine architectural effect, is constructed of buff brick, with light terra-cotta trimmings. It is about two hundred feet square. The interior consists of a central court open from the roof to the ceiling, with galleries at each story leading to the various rooms, and a superb staircase by which the galleries are reached. The purpose of the school is to give instruction in various branches of manual industry, and is maintained by the income of an endowment fund of one million dollars.

In 1891 the city councils ordered free libraries to be established throughout the city, under the direction of the board of education. These are for the circulation of books, and are free. There were six branch libraries in 1896, scattered in different parts of the town, having about 64,000 volumes. The beneficence of Henry Charles Lee enabled the old Philadelphia Library to extend its building and double its capacity. It is a substantial but plain brick building, at the corner of Locust and Juniper streets, enriched by collections that have been accumulating for 160 years, and is now in possession of 180,000 volumes.

Among the institutions for special purposes are the Philadelphia Historical Society, the College of Physicians and Surgeons, the Academy of Natural Sciences, at Nineteenth and Race streets, and the Franklin Institute, on South Seventh Street. All of these institutions have extensive libraries concerned with their specialties. The Academy of Natural Sciences, of green sandstone, is a handsome build-


PHILIPPINE ISLANDS,
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SCALE, 175 ENGLISH STATUTE MILES TO ONE INCH
KILOMETERS.
Submarine Telegraphs
Steamship Lines
International Boundaries
Province Boundaries
Capitals of Countries
HONGKONG
Mirs Bay
Kie-shi
Takow
Heng-chun
Botel Tabago
BASHEE CHANNEL
Batan Islands
Batan I.
Ibayat I.
Babuyan Islands
Babuyan I.
Camiguin I.
Calayan I.
Dalupiri I.
Fuga I.
BALLINTANG CHANNEL
CHINA SEA
C. Bojeador
C. Engaño
Laoag
Aparri
Cagayan
Tuguegarao
Vigan
Divilacan Bay
Camaran Is.
S. Fernando Pt.
Lingayen Gulf
Bolinao
C. Bolinnasay
Lingayen
Dagupan
LUZON ISLAND
Baler
Bongabong
Polillo I.
Bacolor
Port Sual
Balanga
MANILA BAY
Manila Bay
Corregidor I.
MANILA
Kalaguas Is.
Lamon Bay
San Miguel Bay
Taal
Lubang I.
Bauan
Lipa
Batangas
Tanauan
Tayabas
Dalahican
Nueva Caceres
Katanduanes
Lagonoy Bay
Mt. Mayon (Vol.)
Albay
Sorsogon
San Bernardino Channel
Palapa
C. Calavite
Mamburao
Mt. Halcon
Mindoro I.
Romblon I.
Ticao I.
Burias I.
Sibuyan I.
Tablas I.
Masbate I.
Busuanga I.
Mindoro Strait
Calamianes Islands
Culion I.
Pt. Poto
Linapacan I.
North Cape
Cuyos Is.
Cuyo I.
Taitai
Iloilo
Panay
Capiz
Oriental
Tacloban
Samar I.
Catbalogan
San Juanico Strait
Leyte
Pt. Sungi
Malaspina Vol.
Bacolod
Magellan murdered 1521
Mt. Sacripante
Dinagat I.
Cebu
Siargao I.
Bucas I.
Pt. Cauit
Tagbilaran
Siquijor I.
Butuan Bay
Camiguin I.
Butuan
Llanga
Taglebe
Makajalor Bay
Iligan Bay
Cagayan
Misamis
Dapidan Bay
Sindangan Bay
Pt. Gorda
Pt. Santa Maria
Silugdoi Bay
Iligan Bay
L. Malanao
L. Mindanao
Pollok
Mindanao Island
Caraga Bay
Davao
Casama Pt.
Puyaga Bay
C. St. Augustine
Olutanga I.
Zamboanga
Selangan
Mt. Apo (Vol.)
L. Buluan
Leno
Port Lebak
Basilan Strait
Basilan
Isabela
Pangutarang I.
Jolo
Belawan I.
Sulu I.
Maimbung
Lapac I.
Pata I.
Tataan Islands
Stassi I.
Tawi Tawi
Pt. Bucua
Sarangani Bay
Palmas I.
Mata I.
Sarangani Islands
Meares I.
Karkaralong Is.
Kabalusu I.
Ariaga I.
Nanusa I.
Anda I.
Karakelang I.
Talaud Is.
Cabio Is.
Taruna
Salibabu I.
Great Sangir I.
Sulu Archipelago
Sibutu Pass
Sibutu I.
Darvel Bay
St. Lucia Bay
Tawao
C. Unsang
Sandakan
Papar
Mempakol
Labuan I.
Brunei Bay
Brunei
BRITISH NORTH BORNEO
BORNEO
Mt. Mali
Mt. Baling
Mt. Marud
DUTCH
BRUNEI
Balabac Strait
Balabac I.
Banguey I.
Balambangan I.
Mitford
Marudu Bay
Kudat
Kagayan Sulu
Paitan Bay
Marchesa Bay
Abai
Bongon
Gaya
Mt. Kinabalu
Labuk Bay
St. Michael Is.
Suez
Palawan Passage
Barcelona
Loai-ta Bank
Tizard Bank
Investigator Shoal
Rocky Bay
Bugsuk I.
Ulugan Bay
Green Bay
Puerto-Princesa
Palawan Island
ISLAS ADJACENTES
Kagayanes Islands
Tolon Bay
Pt. Bombonon
Negros I.
Guimaras I.
Pt. Naso
Dumaran I.
Cuyo I. (Vol.)
Hinigaran
Tagbilaran
Siquijor I.
Bohol I.
Calape
Malacca
Mindanao
Davao
Casama Pt.
Puyaga Bay
C. St. Augustine
Pt. Coama
Palmas I.
Mata I.
Sarangani Islands
Nanusa I.
Ariaga I.
Anda I.
Karakelang I.
Talaud Is.
Cabio Is.
Taruna
Salibabu I.
Great Sangir I.
Celebes Sea
Sulu Sea
Mindanao Island
Visayan Islands
Luzon Island
Manila Bay
Bataan
Cavite
Caloocan
Malabon
Navotas
Malolos
Bulacan
Pasig
Pateros
Taguig
Pineda
Parañaque
Las Piñas
Bacoor
Cavite Viejo
Noveleta
Rosario
Santa Cruz
San Francisco
Naval Battle May 1, 1898
Cavite Forts
Caridad
Malibay
Binacayan
Sub. Tel. to Hongkong
Sub. Tel. to Hainan
Sub. Tel. to Manila
Sub. Tel. to North Borneo
Sub. Tel. to Labuan
Sub. Tel. to Singapore
Sub. Tel. to Saigon
Sub. Tel. to Batavia
Sub. Tel. to Java
Sub. Tel. to Australia
Sub. Tel. to Yap
Sub. Tel. to Guam
Sub. Tel. to Japan
Sub. Tel. to Shanghai
Sub. Tel. to Amoy
Sub. Tel. to Swatow
Sub. Tel. to Pratas
Sub. Tel. to Macao
Sub. Tel. to Canton
Sub. Tel. to Hainan
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Sub. Tel. to Yap
Sub. Tel. to Guam
Sub. Tel. to Japan
Sub. Tel. to Shanghai
Sub. Tel. to Amoy
Sub. Tel. to Swatow
Sub. Tel. to Pratas
Sub. Tel. to Macao
Sub. Tel. to Canton
THE M'FN. CO.

ing devoted to researches in natural history, and is richly equipped with zoölogical and botanical specimens. It is one of the most vigorous of learned societies in the United States. The population of Philadelphia in 1890 was 1,046,964; by the twelfth census (1900) it was 1,293,697.

PHILADELPHIA COMMERCIAL MUSEUM. See COMMERCIAL MUSEUM, in these Supplements.

PHILÆ, an island of the Nile two miles above the first cataract. See EGYPT, Vol. VII, p. 679.

PHILBRICK, JOHN DUDLEY, educator; born in Deerfield, N. H., May 27, 1818; was graduated at Dartmouth College in 1842. He then became a tutor in the Roxbury Latin School, and later in the Boston English High School. In 1847 he organized the Quincy Grammar School, introducing his own plans, which were adopted for the whole school system of Boston. In 1852–56 he was superintendent of public education in Connecticut; in 1857–74 and again in 1876–78 was superintendent of the public schools of Boston. In 1873 he went to the Vienna Exposition as United States commissioner of education. In 1878 he was a member of the international jury at the universal exposition in Paris. In recognition of his services he received the decorations of the gold palm of the University of France, and the cross of the Legion of Honor. He published *Characteristics of the True Teacher; School Government; City School Systems in the United States*, etc. He died in Danvers, Mass., Feb. 2, 1886. G.J.H.

PHILELPHO. See FILELFO, Vol. IX, 141–142.

PHILIDOR, FRANÇOIS. See CHESS, Vol. V, 522.

PHILIP, KING, an Indian chief, son of Massasoit, chief of the Wampanoags of Massachusetts. Massasoit was friendly to the English, but ill treatment drove Philip into hostility, and he formed a confederation of the tribes for the extermination of the white men, attacking them in June, 1675. The war continued for more than a year, with fierce fighting and sanguinary deeds. Twelve towns were destroyed by the Indians and many of the settlers were slain. Philip was killed by Capt. Benjamin Church, Aug. 12, 1676. G.J.H.

PHILIP OF HESSE. See LUTHER, Vol. XV, *et seq.*

PHILIP, JOHN WOODWARD, naval officer; born in Kinderhook, N. Y., Aug. 26, 1840; entered the United States Naval Academy at Annapolis, Md., in 1856; was appointed midshipman on the *Constitution* in January, 1861, and afterward on the *Santee;* and was promoted acting master and attached to the sloop-of-war *Marion* of the West Gulf blockading squadron on June 1. In 1862 he was on the James River on the *Sonoma*, and from July, 1862, to the end of the war served as executive officer on the *Chippewa*, the *Pawnee*, and the monitor *Montauk*. He was promoted lieutenant-commander in 1866 and captain March 31, 1879, serving on various ships of the Asiatic squadron, and being detached in 1874 to command a Pacific mail steamer, and in April, 1877, to command the Woodruff Scientific Expedition around the world. On Aug. 23, 1894, he was made captain of the Boston Navy Yard, remaining there till Oct. 15, 1897, when he was placed in command of the battleship *Texas*, of the North Atlantic squadron. On May 13, 1898, the *Texas* put to sea as part of the squadron under Commodore Schley, arriving off the harbor of Santiago, Cuba, on the 28th, where it was learned that the Spanish squadron under Admiral Cervera was in that harbor. When the Spaniards left the harbor on July 3, in a desperate effort to escape, the *Texas* took an active part in the pursuit, and though the oldest battleship in the fleet, did very efficient service, being ably handled and her gunnery very effective. In the first movement of pursuit there was imminent peril of the *Texas* cutting into the *Brooklyn*, which unexpectedly crossed her bows. Philip's fine seamanship averted this disaster, both engines being reversed and the battleship halted without a shock. On Aug. 10, near the end of the war, he was promoted commodore, and on Sept. 3, was put in command of the North Atlantic squadron, with the *New York* for his flagship. On Jan. 15, 1899, he succeeded Rear-Admiral Bunce as commander of the Brooklyn Navy Yard; on Feb. 4, was presented with a sword by Governor Roosevelt, and on March 3, was promoted rear-admiral. He died in Brooklyn, N. Y., June 30, 1900. Admiral Philip was a deeply religious man. G.J.H.

PHILIPPEVILLE, the ancient Rusicada, a thriving seaport of Algeria, 40 miles N. N. E. of Constantine, on the Gulf of Stora. In the vicinity are quarries of the famous Filfila marble; also iron-mines. The vine is extensively cultivated. In 1882 a magnificent harbor was completed, with two moles, one 4,590 feet long, the other 1,310 feet. Population (1896), 19,515.

PHILIPPICS. See DEMOSTHENES, Vol. VII.

PHILIPPINE ISLANDS. See Vol. XVIII, pp. 762–67. These islands were formerly a Spanish colony, but by the treaty of peace signed at Paris Dec. 10, 1898, and ratified by the United States Senate Feb. 6, 1899, by a vote of 57 to 27, they were ceded to the United States, the latter Power paying to Spain a *quid pro quo* of $20,000,000. According to most recent statistics the Philippines have a total area of 140,000 square miles, and a population, by recent estimates, of 7,985,124 (4,029,423 males and 3,955,701 females), to which must be added those natives who were never brought into submission to Spanish rule, and who consequently were not enumerated in the census, estimated to number about 1,000,000, making a total population of about 9,000,000. The capital is Manila (q. v. Vol. XV and this Vol.), with a communal population in 1902 of 350,000. The other chief cities, with their communal populations to-day, are: Lipa, 40,730; Banáng, 39,660; Batangas, 39,360; Loang, 37,100. Other towns, with their estimated populations, are San Miguel, 35,000; Cabecera, 30,000; and Iloilo, from 12,000 to 24,000.

The currency of the islands has been on a silver basis, the standard coin being the peso, or Spanish or Mexican dollar. The value of the peso in gold varies, of course, with the market price of silver, and its average value was, in 1894, about 50 cents; in 1895 about 52 cents; and in 1897–98 about 46 cents.

which is about its present value (1899). For 1896–97 the estimated revenue of the islands was 17,474,020 pesos, and the estimated expenditure 17,293,879 pesos; and on Jan. 1, 1898, the national debt was 38,395,080 pesos. At the same date a railway from Manila to Dagupán, 119 miles, was under construction, whereof 70 miles had been completed, being the only railway in the islands. In 1894 there were 505 post offices, with a total delivery of letters and postal cards of 4,684,606 in the internal service, and 2,544,581 in the external; and there were 76 telegraph offices, with 1,592 miles of telegraph and 1,806 of wire, which transmitted 157,573 despatches. The chief products of the islands are hemp, sugar, coffee, cocoanuts (copra), tobacco leaf, cigars, and indigo. Coal to the amount of about 60,000 tons a year has been mined in the island of Cebu, and gold-mining has been carried on to a slight extent in Luzon; but the mineral resources of the islands are still undeveloped. The total value of the imports and exports, in the dealings of the Philippine Islands with all countries, was for the years given as follows:

YEAR	IMPORTS	EXPORTS
1897	$9,174,093	$19,702,819
1900	8,305,530	12,670,436

Trade is chiefly with Britain, Spain, and the U. S. In 1897 the value in silver dollars of the chief exports was: Manila hemp, $18,040,760; sugar, $12,928,000; leaf tobacco, $2,786,200; cigars, $1,694,600; copra, $4,462,920; native fabrics and miscellaneous, $1,429,800. The chief imports are cotton and silk goods, drugs, and chemicals, preserved fruits and confectionery, wines and spirits, umbrellas, and boots and shoes. In 1891 a protective tariff was put in force, which favored trade with Spain at the expense of other countries; and in 1896 the export duties were increased to the detriment of the export trade. In 1894, at the three ports, Manila, Iloilo, and Cebu (the only ones at which foreign vessels have hitherto loaded), the entries were 330 vessels, of 397,335 tons; clearances, 271 vessels, of 358,233 tons. In 1895 the clearances were 304 vessels, of 425,025 tons. The imports into the United States from the Philippines are chiefly hemp and sugar; and the exports from the United States to the Philippines are chiefly flour, petroleum, leather goods, iron, and steel. The total value, in United States currency, of the trade between the United States and the Philippines, during the eleven years 1891–1901, was as follows:

YEAR	U. S. IMPORTS FROM PHILIPPINES	U. S. EXPORTS TO PHILIPPINES
1891	5,167,209	124,572
1892	6,308,653	60,914
1893	9,159,857	154,378
1894	7,008,342	145,466
1895	4,731,366	119,255
1896	4,982,857	162,446
1897	4,383,740	94,597
1898	3,829,003	127,804
1899	4,409,774	404,193
1900	5,971,208	2,640,449
1901	4,420,912	4,027,064

The trade of the islands is mostly in the hands of the Chinese, who number about 100,000. The planters are mostly mestizos, or half-breeds (descended from Chinese fathers and native mothers), who also furnished the educated and professional class, and filled the minor offices. The superior officials were Spaniards, whose desire to amass wealth quickly and return to Spain caused great corruption and oppression. In the interior the real rulers were the Spanish monks, who, especially the Dominicans, were charged with being harsh and exacting masters, and avaricious for the sake of the Church. This charge, though it has been strenuously denied, seems to be well-founded, for during the recent war (1896–97) the natives manifested a savage hatred of the monks as a body, and committed unspeakable atrocities upon them. The military forces maintained by Spain consisted usually of about 3,000 Spanish and about 17,000 native troops, the latter being for the most part mestizos, and probably more or less disaffected. In 1897 the naval force consisted of 5 cruisers, 2 large and 15 smaller gunboats, 5 sloop gunboats, and 3 transports.

Recent History. The corruption and oppression of the Spanish officials and the exactions of the monks were, of course, felt by the people to be great grievances. Another cause of complaint was the *corvée*, which seems to have been introduced about 1887 to make good a deficiency in the revenue, and under which every male non-taxpayer of full age was forced to labor for the government for from two to six months in each year, for wages at the rate of ten cents a day, in addition to food consisting of rice and vegetables costing about four cents a day. Other grievances were extortionate income, poll, and carriage taxes, and excessive license fees. Nor were these the worst evils of misgovernment. Men were arbitrarily arrested and kept in prison, sometimes for years, without trial; and torture was commonly used to extort evidence from witnesses or persons charged with offences; the torture being so ruthlessly applied that, it is stated, ten per cent of those subjected to it died from its infliction. In fact, the government seems to have been more like the worst of mediæval feudal despotisms than the enlightened government of a civilized modern community. Misgovernment of this character naturally produced chronic smouldering discontent, which at intervals broke out into open insurrection. One of these insurrections, known as the rebellion of Cavité, occurred in 1872, but it was of small extent and was speedily suppressed. Other later insurrections were also put down. In 1889, however, a secret revolutionary society, or league, was formed, called the Catipunan (or Ka-tipun an), whose object was to expel the Spaniards and found a republic. This league was an inner circle of members of the Masonic lodges which had been introduced into the islands by the Spaniards. These members constituted themselves a blood brotherhood, by drawing blood from an incision made in the left forearm by a curious knife engraved with symbols used by the league, and then signing a compact with the mingled blood. The society's headquarters were established at Hong Kong, where a junta was formed which directed the movement. The league is also said to have had agents in Japan, Spain, Cuba, New York, and San Francisco. The leading spirit of the society, and the framer of its constitution, was Dr. José Rizal, a

Chinese half-breed, highly intelligent and educated, and the author of some notable books on political and social subjects, and in denunciation of the priests and their rule. One of these works was entitled *Noli me Tangere*, and another *Filibustero*. The news of the breaking out of the insurrection in Cuba, in February, 1895, and of its partially successful progress, led the leaders of the Catipunan to think that the time was favorable for action, and in 1896 a plot was formed to murder the Captain-General, Ramon Blanco, to fall upon and massacre all the Spanish officials and priests, and then to besiege and capture Manila before Spain could send relief. The day fixed for the execution of this atrocious plot was Sept. 15, 1896. Some time before that date was reached, however, it is affirmed that the wife of Pedro Roxas, one of the chief conspirators, revealed the plot in the confessional to a priest, who forthwith reported it to General Blanco. According to another account, however, the confession was made to a priest named Padre Gil, by a sister of one of the native compositors employed in the office of a loyal newspaper in Manila, who was surreptitiously printing some circulars of the Catipunan; whereupon the priest gave warning to the authorities. Be this as it may, the plot in some way came to the knowledge of General Blanco, and he at once sent to Spain for reinforcements, and arrested some 300 of the chief natives, among whom was Dr. Rizal, the leader of the conspirators. He escaped, however, and made his way on board the *Isla de Panay*, a Spanish vessel bound for Spain. His identity was discovered, however, and he was arrested on board ship in Barcelona harbor, Oct. 4, 1896, and after a brief imprisonment was sent back to Manila, and there tried by court-martial convicted, and shot (December 29). Pedro Roxas was also among those arrested, and on Jan. 11, 1897, he and twelve other conspirators, or suspects, were also executed at Manila. In Spain members of the Philippine Club at Madrid, and other suspects, were arrested, and the government sent 2,000 reinforcements to Manila. The arrests in Luzon precipitated the insurrection, which broke out prematurely on Aug. 20, 1896, and war commenced; and by October it is stated that there were about 50,000 insurgents in the field, under the leadership of Emilio Aguinaldo (q. v. *ante*, p. 101*a*). On August 23 four hundred additional arrests were made in Manila, and before the end of the year eighty suspects, including several priests, were sentenced to death. The war was carried on with great ferocity, shocking barbarities being committed on both sides. In November, 1896, the Spanish government, being dissatisfied with General Blanco's conduct of affairs, recalled him and sent General Polavieja in his place, providing him shortly with reinforcements to the number of 15,000. He prosecuted the war for a time with vigor and partial success, and on Jan. 14, 1897, the insurgent chief Eusabio, known also as General Dimaluga, was captured near Bulacan, and shot. The insurrection continued to gain head, however, and General Polavieja applied to the home government for 20,000 more troops, asking to be relieved if these were not sent. Reinforcements were accordingly sent, though not to the number asked for, and he thereupon resumed the offensive and gained some further successes. His health became impaired from malaria, however, and he was recalled, and on March 22, 1897, General Primo de Rivera, Captain-General of Madrid, was appointed to succeed him. The new Captain-General was furnished with further reinforcements, and the war continued with varying success, though mainly to the disadvantage of the insurgents. They consequently became discouraged, and in November, 1897, Aguinaldo entered into negotiations with General Rivera. In December these resulted in a pacification, General Rivera granting a complete amnesty to the insurgents, and agreeing to pay something over $1,000,000 to Aguinaldo and other insurgent leaders, and convey them safely to Hong Kong; and the insurgents surrendering their arms and ammunition, making their submission to Spain, signing a document acknowledging her right of sovereignty over the islands, and solemnly promising not to revolt again. In accordance with these terms, Aguinaldo and other insurgent leaders were, in January, 1898, conveyed to Hong Kong, and a few to Singapore; but the Spanish officials, after raising by taxation the promised $1,000,000, paid over to Aguinaldo only $300,000, and pocketed the rest themselves. Notwithstanding this pacification, however, some of the insurgents in the provinces north of Manila refused to surrender, and continued active hostilities, and in March, 1898, the insurrection in those provinces was reported to be almost as formidable as ever. On Feb. 26, 1898, General Rivera was succeeded as Captain-General by Don Basilio Augusti y Davila. In April, 1898, war broke out between Spain and the United States, and the first serious operation was the naval battle in Manila Bay, May 1, 1898, in which a Spanish squadron, under Admiral Montojo, was destroyed by a United States squadron under Commodore Dewey, who occupied Cavité, a fortified town about eight miles south of Manila. At the outbreak of the war Commodore Dewey had been stationed at Hong Kong, and before leaving for Luzon he and Mr. Wildman, the American consul at Hong Kong, came to an understanding with Aguinaldo, that the latter should follow Dewey to Luzon and again raise the standard of insurrection. In accordance with this understanding Aguinaldo, with twelve other insurgent leaders, took ship on the United States despatch boat *McCulloch*, landed on Luzon, May 24, 1898, renewed the insurrection, speedily occupied the strong places round Manila, closely invested the city, and captured about 4,000 or 5,000 Spanish prisoners, including the wife and children of General Augusti. After holding the wife and children for a time as hostages, Aguinaldo, at Dewey's suggestion, sent them to Augusti. On June 12 the insurgent leaders proclaimed the Philippines an independent republic, decreed the establishment of a provisional government, with its seat at Malolos, and, on June 23, elected Aguinaldo president. On July 5 Aguinaldo issued a proclamation naming the members of his first cabinet. In the meantime Dewey, who had been appointed rear-admiral, subjected Manila to a strict blockade, pending the arrival of United States troops, which were dispatched from San Francisco under the command of

General Merritt. A peace protocol was signed at Washington, Aug. 12, 1898, but before the news reached Manila the American troops, with some assistance from Dewey's squadron, captured the city, Aug. 13, 1898. In September General Merritt sailed from Manila for Paris, to give evidence before the peace commission, leaving General Elwell S. Otis in command. Under the formal treaty of peace signed at Paris, Dec. 10, 1898, the Philippines were ceded to the United States. The Filipino insurgents, however, ignored the treaty, remained under arms, refused to deliver up their Spanish prisoners, who by this time numbered from 10,000 to 15,000, and maintained an attitude of hostility towards the United States troops. On December 23 the Spaniards surrendered Iloilo, in the island of Panay, to the insurgents, who had for some time been besieging the town, and who not merely declined to deliver up the place to the American troops sent to take possession, but even refused to allow the troops to land. In December Aguinaldo's cabinet resigned, and on the 29th of that month he formed his second ministry. The hostility of the insurgents towards the Americans culminated on the night of Feb. 4–5, 1899, in a determined attack on the American lines at Manila, which were held by about 19,500 troops, under command of General Otis. The actual numbers engaged in the battle were about 13,000 Americans, and about 20,000 Filipinos. The attack was continued till the afternoon of Sunday, February 5, but was finally repulsed with a loss to the insurgents estimated at 2,000 killed, 3,500 wounded, and 5,000 prisoners; the loss to the Americans being about 200 killed and wounded. The American squadron under Admiral Dewey gave material aid in repelling the assault. During the ensuing week other conflicts took place, and the Americans captured several of the positions held by the insurgents, and drove them back about ten miles. On Feb. 11, 1899, the American forces under General Marcus P. Miller captured Iloilo without loss; and on March 23, 1901, Aguinaldo was captured at Palanan, province of Isabela, by General Fred. Funston. In July, 1901, military government was superseded by civil government and Judge W. H. Taft, of Ohio, appointed civil governor of the Philippines. On his resignation Feb. 1, 1904, he was succeeded by Luke E. Wright, of Tennessee.

PHILIPPOTEAUX, Félix Emmanuel Henri, a French artist; born in Paris, April 3, 1815. He is famous for his historical and battle paintings, including *Louis XV Visiting the Battlefield of Fontenoy*, now at the Luxembourg; *The Last Banquet of the Girondins*, at the Museum of Marseilles; and *The Siege of Paris*, a cyclorama. He died in Paris, Nov. 8, 1884.—His son Paul Philippoteaux, a French historical painter; born in Paris in 1846. He assisted his father in preparing the *Cyclorama of the Siege of Paris*, and made a similar representation of the *Battle of Gettysburg*, which has been exhibited in New York, Chicago, Philadelphia, and other cities. In 1888 he exhibited a series of thirty large paintings illustrating the career of General Grant.

PHILIPS, Francis Charles, an English novelist and dramatist; born in Brighton, Feb. 3, 1849; educated at Brighton College and the Royal Military College, Sandhurst, and in 1868–71 was in the 2d Queen's Royal Regiment; in Jan., 1884, was called to the bar. His principal novels are *As in a Looking-Glass* (1885), which was published in every capital in Europe; *The Dean and His Daughter* (1887); and *Mrs. Bouverie* (1894).

PHILIPSBURG, a borough of Center Co., Pa., on the Moshannon river, 38 miles N. E. of Altoona; is the centre of the bituminous coal region, there being 22 collieries in the vicinity. Pop. 1890, 3,245.

PHILIP THE BOLD and PHILIP THE GOOD. See Burgundy, Vol. IV, p. 479.

PHILISTOS, a Greek historian. See Sicily, Vol. XXII, p. 24.

PHILLIMORE, John George, lawyer; born in Oxfordshire, England, in 1809; was educated at Westminster and Oxford, admitted to the bar at Lincoln's Inn in 1832, became eminent in his profession, and was returned to Parliament for the borough of Leominster in 1852. He favored electoral and judiciary reform, the abolition of tithes, etc. He was the author of *History of the Law of Evidence; Private Law among the Romans*, etc. He died April 27, 1865. G. J. H.

PHILLIMORE, Sir Robert Joseph, an English jurist, brother of preceding; born in London, Nov. 5, 1810; called to the bar in 1841; judge of the High Court of Admiralty, judge of Arches (1867–75), and justice of the High Court of Justice, probate and admiralty division (1875–83); member of Parliament (1853–57); was made a knight in 1862, and a baronet in 1881. He wrote *Commentaries on International Law; Ecclesiastical Law of the Church of England* (1876); and *Memoirs and Correspondence of George, Lord Lyttleton* (1883). Died Feb. 4, 1885.

PHILLIPPS, Adelaide, an English contralto singer; born in Stratford-on-Avon, Oct. 26, 1833; began as a dancer in public at Boston, Mass., Jan. 12, 1842; was encouraged by Jenny Lind to study singing abroad, and in 1854 made her operatic début in Milan, as Rosina. Her voice was of unusual compass. Her last appearance was in Cincinnati, in 1881. She died in Carlsbad, Germany, Oct. 3, 1882.

PHILLIPS, a post village, the capital of Price Co., Wisconsin, 78 miles S. S. E. of Ashland; has 3 churches, 2 newspaper offices, a bank, a saw-mill, and a tannery. Population 1900, 1,820.

PHILLIPS, Lawrence Barnett, a British inventor and painter; born in London, Jan. 29, 1842. In 1861, having invented a keyless watch, he began business as a wholesale watch and chronometer maker; later he constructed complicated and highly finished specimens of the horological art, and by the invention of various forms of mechanism simplified chronographs and calculating-machines. He wrote *Autographic Album* (1866); *Horological Rating Tables* (1871); and *Dictionary of Biographical Reference* (1873). In Nov., 1865, he became fellow of the Royal Astronomical Society, and in March, 1885, of the Society of Antiquaries. He retired in 1882, occupied himself as a painter and etcher, was a constant exhibitor at the Royal Academy and the leading London and provincial exhibitions, and was elected an associate of the Royal Society of Painter-Etchers.

PHILLIPS, Philip, an American composer and

singer; born in Chautauqua Co., N. Y., Aug. 13, 1834; sang at religious revivals; published *Musical Leaves* (1862); *The American Sacred Songster* (1868); *Song Pilgrimage Around and Throughout the World* (1880). His collections of songs were popular. Died in Delaware, Ohio, June 25, 1895.

PHILLIPS, WENDELL, abolitionist; born in Boston, Mass., Nov. 29, 1811; was educated at the Boston Latin School and at Harvard College, graduating in 1831; afterward took a three years' course in the Harvard Law School; and was admitted to the bar in 1834. Up to this time he had taken no interest in the reform with which his name was afterward associated, but was made an abolitionist in 1835, when he saw a pro-slavery mob drag William Lloyd Garrison through the streets, with threats to hang him. The incident that made him a leader of the abolitionists was the meeting called by William Ellery Channing in Faneuil Hall, Dec. 8, 1837, to denounce the murder of Mr. Lovejoy for his abolition sentiments. Mr. Phillips had never yet delivered a public address, but at the request of the chairman he rose and made a short speech, which carried the audience by storm. In his denunciation of assassination and demand for freedom of speech he had proved himself one of the great orators of the world. From that day forward the life of Wendell Phillips was devoted to reform, which he defended with soul-felt enthusiasm, and unsurpassed eloquence. He accepted Garrison's full creed as to the moral obliquity of slavery and did more than any other man to convert the North to abolition views. He was a strenuous advocate of the equal rights of women with men as members of anti-slavery societies, and in 1840, at the World's Anti-Slavery Convention in London, pleaded earnestly, but vainly, for the admission to the convention of the women delegates from the United States. He continued his work without cessation till the period of the Civil War and the date of Lincoln's emancipation decree. In 1864 he opposed the re-election of Lincoln, which led to a controversy between him and Garrison. This was made more intense in 1865 when Garrison favored the dissolution of the Anti-Slavery Society and Phillips opposed it, declaring that its work would not be completed till the freemen were given the right to vote. As a result Phillips replaced Garrison as president of the society, which continued in existence until 1870, he taking a conspicuous part in the reconstruction controversies. In addition to his services in the cause of freedom for the slave, Mr. Phillips was equally earnest in maintaining the doctrine of the equal rights of women, in defending the cause of temperance, and in sustaining the Irish demand for Home Rule. The workingman found in him an untiring champion, and the Indians an able and eloquent friend. In his later days he became a member of the Greenback political party, holding that "the existing system of finance makes the rich richer and the poor poorer and turns the republic into an aristocracy of capital." His last public appearance was on Dec. 26, 1883, at the unveiling of a bust of Harriet Martineau in the Old South Church of Boston. His wife, Anne Terry Greene, was an invalid throughout her married life. He was a man of fine and commanding presence and of graceful and courtly bearing, and the most polished orator on the American platform. He died in Boston, Mass., Feb. 2, 1884. G.J.H.

PHILLIPS ACADEMY, the name of two nonsectarian institutions, one at Andover, Mass., and the other at Exeter, N. H. The former was founded by Judge Samuel Phillips, Jr., with the aid of his father, and of his uncle, John Phillips (1719–95), the school being opened April 30, 1778, with 30 pupils. It was chartered in 1780, and in 1807 the class in theology became the Andover Theological Seminary It has 8 instructors and an average attendance of about 45; occupies twenty buildings, valued at $100,000, including dwelling-houses, dormitories, an academy hall, a chemical laboratory, a gymnasium, and a library of 52,000 vols. The endowment is $800,000.—PHILLIPS EXETER, an English and classical school for boys, founded in 1781 by John Phillips, opening May 1, 1783. There are 10 instructors and an average attendance of 250 pupils. It occupies buildings valued at $100,000, including a physical laboratory, a chemical laboratory, a large gymnasium, and a library of 1,600 volumes.

PHILLIPSBURG, a city, capital of Phillips Co., Kansas, 200 miles W.N.W. of Topeka, in a prairie region, producing corn, cereals, sorghum, potatoes, hay, wool, and live-stock. Pop. 1890, 992; 1900, 1,008.

PHILLIPSBURG, a mining town, the capital of Granite Co., Mont., 70 miles W.S.W. of Helena; has 2 banks, 2 newspaper offices, 2 quartz-mills, and gold and silver mines. Population 1900, 995.

PHILLIPSBURG, a town of Warren County, New Jersey, in the northwestern part of the state. It lies on the Delaware River, opposite Easton, Pennsylvania, with which it is connected by bridges, and is reached by the Central of New Jersey, the Delaware, Lackawanna and Western, the Pennsylvania and the Lehigh Valley railroads. Its population in 1900 was 10,052. W.F.J.

PHILOCHORUS, Greek historian. See EURIPIDES, Vol. VIII, p. 595.

PHILOCTETES, the most celebrated archer in Greece, possessor of the bow and poisoned arrows of Hercules. He was one of the suitors of Helen which caused him to take part in the Trojan War. He led the Grecians against Troy, but, on the voyage thither, he was left behind by his men on the island of Lemnos because he was ill of a wound caused by the bite of a snake received in the island of Chryse. He was showing the Greeks the altar of Athena Chryse and approached too near to the serpent which was guarding the temple of the goddess. He was brought to Troy from Lemnos by Ulysses, because an oracle had declared that Troy could not be taken without the arrows of Hercules. On his arrival at Troy he killed Paris and ended the war. Returning from Troy he was shipwrecked on the coast of Italy where he built Petelia and Crimissa. W.R.B.

PHILOMATH, village, Benton Co., Ore., 16 miles from Albany; is the seat of Philomath College (United

Brethren and co-educational), founded 1866, which had, in 1899–1900, 9 instructors, 116 students, and a library of 600 volumes. Population, 1900, 343.

PHILOMELA. See NIGHTINGALE, Vol. XVII. p. 512.

PHILOSOPHY OF THE CONDITIONED. See HAMILTON, Vol. XI, pp. 373–376.

PHILTER (Gr., *philtron*, love charm). The ancients had a superstitious belief in the efficacy of certain artificial means of inspiring love, and both Greeks and Romans continually employed love charms and love-potions. It is not known with certainty of what ingredients the love-potions were composed, but, doubtless, they contained certain deleterious and poisonous drugs to which other substances — animal as well as vegetable — were added, the mixing process being accompanied by magical rites. Lucretius is said to have been driven mad with a love-potion, as was also the Emperor Caligula. W.R.B.

PHINTIAS. See ALICATA, Vol. I, p. 506.

PHIPS OR PHIPPS, SIR WILLIAM, colonial governor; born at Woolwich, Me., Feb. 2, 1651. Becoming a ship-carpenter, he engaged in ship-building and in trading in Boston, and in 1684–87 succeeded in recovering treasure to the value of £300,000 from a ship sunk near the Bahamas. For this he was knighted by James II, and appointed sheriff of New England, but on his return failed to obtain this office from the governor. In 1690 he led a military expedition against Port Royal in Acadia, which he captured, and commanded the naval force sent by Massachusetts for the conquest of Quebec. This met with a serious repulse. In 1692 he was appointed governor of Massachusetts, and at once established a court for the trial of the alleged Salem witches, many of whom were executed. He then became involved in numerous quarrels. He died in London, Feb. 18, 1695. G.J.H.

PHLEBITIS. See SURGERY, Vol. XXII, 719.

PHLEGMON. See PATHOLOGY, Vol. XVIII. p. 408, 410.

PHLOGISTON. See CHEMISTRY, Vol. V, pp. 399, 400.

PHOCIDÆ. See MAMMALIA, Vol. XV, p. 450.

PHŒBE-BIRD (*Sayornis fuscus*), a popular name of the fly-catcher of the United States. It is often called pewee or pewit. The names are attempted imitations of the peculiar notes of the bird.

PHŒNICIAN LANGUAGE. See PHŒNICIA, Vol. XVIII, p. 815; and SEMITIC LANGUAGES, Vol. XXI, pp. 678, 679.

PHŒNICOPTERUS. See FLAMINGO, Vol. IX, pp. 249, 250.

PHŒNIX, a city and the county seat of Maricopa County, Arizona, in the southwest-central part of the territory. It lies on Salt River, 20 miles above its junction with the Gila River, and is reached by the Maricopa and Phœnix railroad, a spur from the Southern Pacific. Its dry climate makes it a health resort for many invalids, especially pulmonary patients. Its population in 1900 was 5,544. W.F.J.

PHŒNIX, a village of Oswego County, northern central New York, on Oswego River and canal, and on the Rome, Watertown and Ogdensburg railroad, 15 miles N. of Syracuse. It is in a dairying, farming and fruit-raising district; has an excellent water-power, and contains saw and flour mills, and manufactures of cutlery and tissue-paper. Population 1890, 1,466; 1900, 1,532.

PHŒNIX PARK ASSASSINATIONS. See *Lord Frederick Cavendish*, under DEVONSHIRE, and also HOME RULE, in these Supplements.

PHŒNIXVILLE, a borough of Pennsylvania. It had, in 1890, two railroads, the Philadelphia and Reading and the Pennsylvania. There are in the borough numerous churches, a seminary and good public schools, two national banks with a combined capital of $350,000, a public park, water-works and fire department. The works of the Phœnix Iron Company and the Phœnix Bridge Company are located here, and give employment to about 2,400 men. Other industries include manufactures of shirts, hosiery, pottery, machinery, silk and needles. Population 1900, 9,196. See also PHŒNIXVILLE, Vol. XVIII, p. 824.

PHONAUTOGRAPH. See ACOUSTICS, Vol. I, p. 103.

PHONOGRAPH. Another recent product of electro-mechanical science, and one which bids fair to surpass even the telephone in commercial value, is the marvelous instrument known as the "talking-phonograph." The discovery of the phenomena on which it is based was made by Mr. Edison as far back as 1877, while the great electrician was engaged on some experiments for a totally different end. The underlying principle is the same law of acoustics operating in the telephone, that sound consists in a series of waves spreading from a given source, and that their impact at any distance is in exact ratio to the pitch and volume of the original note. With a knowledge of the action of this law in the vibrations on the telephone diaphragm, it will not be difficult to understand the working of the phonograph, its essential purpose being to obtain a record by which sound-vibrations, whether of the human voice or some other agency, can be mechanically reproduced at any time after their occurrence.

As originally made, the instrument consisted of three parts,—the sender, the receiver or recorder, and the transcriber. The sender comprises a tube having an open mouthpiece at one end, and bearing at the other end a thin diaphragm of metal or other substance, with a sharp point, or stylus, affixed to the center of its outer surface. The second part consists of a cylinder about four inches in diameter, having on its periphery a V-shaped groove, cut spirally from end to end. Over this grooved cylinder a sheet of tinfoil is placed, and the sender is advanced till the point of the stylus lightly touches the tinfoil over the opening of the V-shaped cut. While the words to be recorded are spoken or sung, the cylinder is turned rapidly, the apparatus for moving it giving a lateral as well as a circular motion. The point of the stylus thus traverses the tinfoil spiral from end to end, and the vibrations in the diaphragm caused by the sound result in a series of indentations in the tinfoil. To produce the sound

in the sender or transcriber, the cylinder is again presented to a stylus attached to a diaphragm, the pointer being pressed against the tinfoil by a light spring. The cylinder is now made to revolve, and the motion of the stylus upon the inequalities in the indented tinfoil produce vibrations in the diaphragm corresponding to the sound-caused vibrations originally created in the instrument by the voice. The sounds are thus reproduced with great exactness, but with a softening of the consonants which, to some extent, alters the character of the voice. If the tinfoil record of song or spoken words be sent to a distance, or kept for a length of time, the original sound can be reproduced on applying it to the proper instrument.

Many defects were soon apparent in the working of this instrument, while its wonderful possibilities continued to excite the deepest interest. Ten years after his first revelation, Mr. Edison took up the invention again, and after careful study produced, in 1889, the phonograph as it is known to-day. The tinfoil is now replaced by a wax composition, which not only gives better results, but enables the vibration records to be multiplied in durable form. An electric motor serves to turn the cylinder; the diaphragms are of glass, and the stylus has a sapphire point. The utterance is also made into a trumpet or funnel, while for hearing back the communication rubber tubes are provided with tips to fit in the ears. Dictations are now commonly given in the phonograph for type-writers to transcribe in another place. Songs are sung before it, and speeches and sermons addressed to it, that may be later enjoyed by many who were never within hearing-distance of the vocalist or speaker. Even the tones of the illustrious leaders and teachers of men are thus stored up, that they may be heard by posterity just as they were delivered. Among the latest developments is the sending of the cylinder-strips by mail, so that a correspondent hundreds of miles away may actually speak his message from the duplicate machine in which the recipient places it. What the invention will accomplish for us as it becomes cheaper and more accessible is simply beyond guessing. See also TELEPHONE, Vol. XXIII, p. 146; and GRAPHOPHONE, in these Supplements.

PHONOGRAPHY OR STENOGRAPHY. See SHORT-HAND, Vol. XXI, pp. 875–881.

PHONOLITE. See GEOLOGY, Vol. X, p. 209.

PHONOLOGY. See PHILOLOGY, Vol. XVIII, pp. 800–802.

PHONOMETER, an instrument devised by Thomas A. Edison for measuring the force of sound-waves produced by the human voice. It has a mouthpiece and diaphragm. Behind the latter a piece of rubber communicates with a spring that actuates a pawl, which is set to move a ratchet keyed to the same shaft as a fly-wheel. The instrument shows that the mechanical force of sound is considerably greater than was previously supposed. A loud, continued noise in the mouthpiece will drive the fly-wheel, which is about 15 inches in diameter, with a force sufficient to bore a hole through a pine board.

PHONOPHORE, a telegraphing device invented by Mr. Langdon-Davies of London. Some years ago he first developed the system of transmitting signals through circuits, which in the ordinary sense are not closed. Recent experiments in his laboratory were made through an artificial line of four thousand ohms' resistance, and comprised the sending of phonophore messages alone and of phonophore and telegraph messages simultaneously in the same wire, and in the same or opposite directions. In one experiment the same wire transmitted a telegraph message and two phonophore messages simultaneously, and the working of the phonophores was perfect, even after the resistance of the line had been increased to twenty-three thousand ohms, when the telegraph messages, which were received by needle instruments, could no more be read. A further experiment was made with a line wire open at both ends, and containing a resistance of one hundred thousand ohms. In this case the ordinary telegraph could, of course, not be worked at all, but duplex working of the phonophore was perfectly feasible.

At St. Pancras, messages were being sent by phonophore between London and Leicester, in both directions, on one of the company's wires which all the time transmitted ordinary telegraph messages. The London phonophore was joined to the line between two Morse relays about half a mile apart, one at the passenger and the other at the goods station, while the Leicester phonophore tapped the line thirty miles from the nearest telegraph instrument, which is at Derby. Between Leicester and London there are, on this wire, about six telegraph instruments, and as during operation the continuity of the line is constantly being broken by the working, each instrument is shunted by a phonophore, so that the phonophore messages are translated some six times.

This method of bridging the telegraph instruments does not in any way diminish the clearness of signals as compared with a continuous wire. The messages were printed on a Morse receiver, which was actuated by a phonophore relay. The phonophore transmitter has a vibrating reed, and the distant phonophore receiver is also provided with a reed in the shape of a stretched steel band which can be tuned to the same note.

PHONOSCOPE. G. Demeny's instrument for the use of deaf mutes is a form of phenakistoscope, having a wheel on which are mounted continuous photographs of a person's face taken while uttering certain words. The wheel being mounted in a suitable box, the photographs may be rotated by a hand-crank, and viewed through a slit. A deaf mute, or other person understanding the facial motions incident to speech, may then interpret the words uttered by the person when the series of photographs were taken. Another form of phonoscope is designed to give visual representations of sound-vibrations. The mechanism includes an induction-coil, an interrupter and a rotary vacuum tube. The sounds of the voice may be made to vibrate a diaphragm in the interrupter, and these vibrations cause breaks in the current from the induction-coil. The makes and breaks of the current cause flashes of light in the vaccum-tube, and as the tube is rotated these flashes take symmetrical shapes, forming

streaks radiating from a center, the number of radii varying with the nature of the vibrations. The same sound always produces the same figures.

PHONOTELEMETER, an instrument for estimating the distance of a mark, etc., invented by Captain Thouvenin of Vincennes, France. It is a watch with a curve-measurer on the face, a compass on the stem, and a telemeter counter on the back. The curve-measurer is for determining distances on maps. For judging of distances on the field of battle, the plan is to start the watch on sight of an enemy's fire, and stop it when the detonation is heard, when the telemeter indicates the distance in meters.

PHORMINX OR CITHARA. See LYRE, Vol. XV, p. 115.

PHORMION, an Athenian admiral and general who distinguished himself by so maneuvering the Athenian fleet in the Corinthian Gulf that he gained some remarkable victories over the Peloponnesian fleet in 429 B.C. In the following year he gained victories in the interior of Acarnania.—PHORMION or PHORMIO, an Ephesian philosopher of the Peripatetic school. See PERIPATETICS, Vol. XVIII, p. 557.

PHOSPHATES. See PHOSPHORUS, Vol. XVIII, pp. 830–832; and APATITE, in these Supplements.

PHOSPHINES. See CHEMISTRY, Vol. V, 501.

PHOSPHOR-BRONZE. See PHOSPHORUS, Vol. XVIII, p. 830.

PHOSPHORIC ACID. See PHOSPHORUS, Vol. XVIII, pp. 831, 832.

PHOSPHOROSCOPE. M. Becquerel's device is described under LIGHT, Vol. XIV, p. 607. Another form of phosphoroscope is a toy consisting of pieces of hollow glass made in tubes or to represent figures, and filled with some familiar phosphorescent substance exhibiting color, as the sulphides of lime, barium, etc. When exposed to the light and then brought into a dark room the figures glow with colored light.

PHOTO-BAROMETER. See BAROMETER, Vol. III, p. 331.

PHOTO-CHARTING. See SURVEYING, Vol. XXII, pp. 753, 754.

PHOTOCHRONOGRAPH, a form of chronograph adapted to measuring the time of photographic exposures of short duration. One form consists of a blackened disk which is made to rotate, with a spring pressed against its face. Power is applied to the disk, which is started by releasing a brake, and stopped by putting it on. The instrument is set up facing the camera, in a strong light. A lever is worked to vibrate the spring. The disk being rotated during the exposure, a waved white line is traced on its face by the vibrating spring. The length of the line and the vibrations being noted, the exact length of time is very accurately determined.

PHOTOCHRONOGRAPH, ASTRONOMICAL, an instrument for photographing a star, or the like, and also recording the time of its transit. It is a photographic device, connected with an astronomical chronograph and a transit instrument, and was designed by George A. Fargis and Frank H. Bigelow. The chronograph is used to record the time of transit of stars across the reticle lines or wires of the telescope, and the addition of a photographic device was desired to reduce the errors caused by visual observance of the passage of the stars. It was necessary to do this without injury to the star-trails, and the result was accomplished by means of a small plate attached to the armature of a magnet, by which an up-and-down movement, perpendicular to the star-trail through a small interval, could be communicated to the plate by making and breaking the circuit at fixed intervals, preferably by means of a clock. The intervals shown on the plates taken with this apparatus are definitely marked, and settings of a micrometer-thread may be made on them very accurately, with a probable error of not more than one fiftieth of a second.

PHOTO-ENGRAVING OR PHOTOGRAVURE. See PHOTOGRAPHY, Vol. XVIII, p. 847; SURVEYING, Vol. XXII, p. 754; and ENGRAVING, in these Supplements.

*PHOTOGRAPHY. It is not the purpose of this article to supply a history of photography, but to record the advances made in recent years. Only the most serviceable of these can be noticed. (For a full treatment of the origin and history of photography to 1880, see Vol. XVIII, pp. 834–854.)

From "the beginning," so far as we know, until the present century the lovely images which responded to the action of light upon material objects were fugitive. Ultimately, means were discovered for fixing them, and—but the story is familiar to every one, so it is needless to repeat it.

The production of pictures by the processes of photography is so symbolical of creation, is so fascinating, and so applicable to the world's work in endless directions, that the art has never wanted for enthusiastic votaries willing to face its drawbacks and difficulties, and by patient research and persistent experiment overcome them.

The aims and results of photographic research, then, will be considered here, rather than chronologies. To reduce the time required to secure the latent image has been one of the chief aims of the experimentalist. Effort had to be made in various directions. When lenses were first employed in photography they were very imperfect. Among other things, they distorted the image, and their action was all too slow. The first fault was due to construction, and the latter to material. How to correct the lenses, then, "for figure" and "for color" was an early problem. Step by step this was solved, and years ago objectives were made by which perfect pictures were secured instantly, define that term as you will. Vast progress has been made during the three years last past by the use of a new kind of glass introduced by Abbe and Schott at Jena, Germany. This wonderful product enables the lens-maker to employ a variety of about seventy sorts of optical glass instead of, say, less than a dozen, formerly available. Nearly all of the old faults having been overcome, the opticians now devote

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themselves to the niceties of construction, while the difference in result becomes a matter of choice.

Chemistry has proven such a faithful handmaid to optics that the patient plodders in the laboratory are entitled to share the honor of bringing forth so quickly the most *spirituelle* impression of the faintest ray falling upon the sensitive surface, by the most beautiful operations known in science. In the technique or workmanship of the photographer the greatest changes have taken place, accompanied by important improvements in the results. These improvements, in the posing of the model and in the management of the light, have been made possible by the careful study and application of art principles and by the investigation and better understanding of the theory and management of light.

With the portraitist, these direct not only the choice of position and the control of the light, but also the selection and arrangement of the accessories.

The exposure of the sensitive surface is very often a matter of inspiration, and must be determined by the circumstances of the occasion. Useful exposure-meters are much used out of doors, and their employment, with the selection of the subject, the direction of the light, the management of the shadows, the choice of the day and of the time of day, is involved in the technique. A wider intelligence, greater care, attention to trifles, better "workmanship" in fact, have repaid with "pictures" as well as photographs.

In the earlier days no attempt was made at photography without sunlight, and plenty of it. Now, light from a variety of sources is employed. The once uncertain magnesium light, the incandescent gaslight, the erratic electric spark and the mysterious cathode ray (even "black" light), all render service whenever sunlight is either inaccessible, insufficient, inconvenient or indisposed. Even the glow-worm emits sufficient light to affect the sensitive plate.

After the exercise of the most intelligent technique, followed by careful manipulation, comes the employment of the retouching pencil to "correct" weaknesses and oversights, or, what is all too frequently the case, to annul and despoil the values secured by the previous operations.

In the *manipulatory* department extensive changes have been made. So great are these that the modern or "dry"-plate photographer finds himself wholly unable to cope with the difficulties of the old-time or "wet"-plate processes.

Although films and pellicles were suggested as substitutes for glass as early as 1871, they have not yet proven themselves preferable. By their use a saving is effected in weight and bulk; their liability to break is less than that of glass, and they make the rollholder possible. But their manipulation is often troublesome; their quality is too much controlled by the material upon which they rest (usually celluloid), and they cause much disappointment by deterioration and faults of manufacture.

The orthochromatic or isochromatic plate renders it possible to photograph colors at their true value, or approximately so. Color-sensitiveness is secured by the addition of certain aniline dyes (usually of the eosine group) to the sensitive bromide of silver emulsion. A color-screen is employed with these plates to secure the most delicate color-values.

One of the most annoying drawbacks of the modern dry plate is halation, or the spreading of the light beyond its proper boundaries in the negative image. Reflection of light from the back surface of the plate is the chief cause. The tendency to halation is obviated in several ways: 1. By coating the plate with more than one film of emulsion differing in sensitiveness; 2. By staining the emulsion with a dye which will wash out during the processes of development and fixing, and by "backing" with an opaque mixture in optical contact with the plate.

The development of the image has received the most attention of any of the manipulations. It affords opportunity for an infinite variety of modifications. The improvements sought for by these have been in the direction of speed and quality. As record cannot be made here of a tithe of the suggestions and formula available. A good working-process is presented below, which, with thoughtful use, will answer all ordinary demands. Improved results are secured by the intelligent use of the fixing-solution. The first thing which made this possible was the production of a purer quality of hyposulphite of soda; the next grew from the consent of the manipulator to employ the hydrometer and the thermometer to standardize the fixing-solution. The importance of such tests cannot be over-rated.

Complications constantly arise because of the indisposition to agree upon a standard of weights and measures.

Printing. The art of producing positive photographs upon prepared paper or other surfaces has met with numberless changes, although none of the old processes have become obsolete.

The desire for easier manipulation has caused many to depart from the use of albuminized paper, and resort to ready-sensitized gelatine and collodion papers. Those objecting to the brilliant surface of the above have recourse to mat-surface papers of various kinds, while the carbon and the platinum printing processes, with modifications, hold a share of the preference.

Time has not furnished a method of overcoming deleterious chemicals, careless manufacturing and indifferent manipulation, so that some photographs are yet found to fade.

The introduction of papers coated with silver bromide and gelatine, in emulsion similar to that used in the production of "dry" plates, opened up new industries, practically. By their use, with the assistance of electric light, enlargements and direct prints are made with the greatest facility. When thousands of one subject are

desired they are quickly and uniformly produced by the use of bromide paper and automatic machinery with electric light. In the development of bromide prints on certain papers, a brush is used to apply the developer in lieu of the other methods. In the platinum and other processes, the brush is used likewise.

The intelligent demands of the user of apparatus has been faithfully met by the manufacturer, until now the product, in design and construction, is equal to the best of philosophical and astronomical appliances. In this direction, also, greater speed and improved quality have been obtained.

Rapid reproduction has also been sought for most industriously. While the old-time printer stood dozing over his negatives as they rested in the sun, he dreamed of a quicker method of multiplying his pictures with the promise of longer life for them. By numerous processes this dream has been realized; and now the steam-press is the printer, and the pictures it produces far surpass the earlier product of the veteran dreamer. All methods of hand-engraving have been compelled to share with this young usurper of the reproductive arts. It has also bound the powerful electric light to its service; chained intricate machinery; started new industries for the production of supplies; and is now compelling nature to yield her natural colors to the cajolery of the camera.

So, then, photography has become the chief factor in the illustration of books, magazines and periodicals, using processes detailed in the articles on photo-engraving and in the text-books of the art. (See PHOTOGRAPHY, Vol. XVIII, p. 847; and ENGRAVING, in these Supplements.)

The further applications of photography are without limit. So willing and able a helper has it become that scarcely an advance is made in science, art or industry, until answer is had, through actual test, to the query, "What does photography say?" The stars are not too numerous for it to count; neither sun nor moon can hide their spots from it; the swiftest projectile leaves its track upon the sensitive plate; faithfully it records the tones of the sweetest voice; catches the thoughts nestled in the brain; discovers the "skeleton" in every human house; burrows under the ground; dives into the sea; climbs up into the air; steals into every niche; reveals what the eye cannot see or the senses discover. Among the distinct advances in which modern photography helps, the following are worth noting briefly:

Photo-grammetry, the use of photography in surveying, determining and mapping boundaries, new countries, etc.

Composite photography, following the work of Galton.

Photographs of movement, in which Anschutz, Muybridge and Marey have done wonderful things; kinetoscopy and the cinematograph; long-distance photography, made possible by the tele-photographic lens.

Spectrophotography, and its usefulness in chemistry and astronomy.

The usefulness of photography in meteorology —study of earthquakes, barometric observations, wind, lightning, clouds, etc.—is extensive.

In medicine and surgery photography is useful. The larynx, the interior of the stomach, the eye, and other organs, are exposed by it. The identification of criminals, the detection of forgeries, and other uses in judicial procedure; the registration of ships' courses (and wave-lines used in naval-construction), the determination of latitude by photography, photo-micrography and micro-photography—all find their acceptance to an unlimited extent.

The use of photography in providing subjects for magic-lantern or stereopticon projections, and for the microscope, next to portraiture, gives the most pleasure and instruction.

By white light, by colored light, by black light or by any other light—all these serve. "Let there be *light*," and photography will answer any demand.

Two of the most recent applications of photography are, at this writing, exciting the greatest public interest. The first involves the discovery of Prof. W. C. Roentgen that fluorescent rays are developed in peculiar abundance in the highly exhausted tubes known as Crookes tubes, and that they will penetrate with unexpected facility a great many optically opaque substances. Experimenters do not agree as to the character of these rays. Professor Roentgen says they proceed from the cathode terminal; Professor Rowland and others claim that they come from the anode; while Tesla claims that they are not vibrations of any sort, but are streams of projected material particles. Profs. O. N. Rood and A. M. Mayer have proven that the new rays are incapable of polarization, and therefore radically different from any rays of light or heat heretofore observed. This much is sure,—i.e., that they possess great photographic power, and that the photographic plate has yet another means of *seeing in the dark*, besides that due to its power of perceiving vibrations whose wave-length is too short to affect the nerves of the retina. President Henry Morton of Stevens Institute claims this *accumulative* action, or capacity of *storing up* the effects of any sort of vibrations capable of impressing it (rays too feeble to affect the eye), will, in time, impress the sensitive film. Proof of this is abundantly shown by the photographs of stars too faint to be perceived by the eye, taken at the Harvard Observatory, under the Henry Draper memorial, by Professor Edward C. Pickering. The peculiar properties of fluorescent light were publicly exhibited by President Morton as early as 1872. This was soon after his discovery of *thallene*, a hydrocarbon which possesses the property of fluorescence in a remarkable degree. See *Chemical News* (1872), *L. and E. Phil. Mag.* (1873), and *American Chemist* (1873).

Lastly, but practically most important of all, is *photographs in natural colors*. These, made without applying the colors by hand, or in some other mechanical way, do not yet exist. The efforts to produce them began with Niepce de St. Victor,

and have since led experimentalists in about as many directions as has the production of pictures in black and white. They have been attempted in the chemical way (by silver subchlorides), in the physical way (by the action of interference in the interior of the film), and in the optical way (by the projection of three-glass positives, corresponding to the foundation-colors, with the help of corresponding colored media), and some very beautiful results have been shown, but the great secret is yet withheld. Nevertheless, wonderful progress has been made in the production of pictures in natural colors with photographic effects. Photography has been the principal means employed, letterpress coming in as second helper. More has been done than the simple use of photography as a "key" in letterpress color printing. In what is termed the "three-color process," photography is used throughout for the production of the printing image. This was reached by a long series of experiments, beginning in 1861, but not much headway was made for a few years, because of the absence of photographic plates sensitive to the yellow or red rays. In 1873 Dr. H. W. Vogel of Berlin discovered how to produce such plates. He was soon followed by others; but not until 1892 did the results prove that a practicable method had been attained for three-color reproductive purposes. The collotype printing process was first used, and numerous American establishments are, at the present time, producing unlimited quantities of prints of excellent quality by this method. But the application of the three-color process to letterpress printing, by means of the transfer of the three different photographic images to letterpress or half-tone blocks, now supplies the most economical and expeditious method, with results which have not been excelled. They appear in the market as reproductions usually because of the long time required for the exposure of three negatives, and the obvious difficulty encountered in procuring three negatives (so exactly alike that they register) from any natural or "living" object or scene.

Mr. R. D. Gray of New York, a practical optician, has secured the best results. To combine or superimpose the pictures is not a serious matter if suitable apparatus is provided for it. Mr. Gray makes ordinary positives on glass for lantern projections, and secures one of them in a wooden frame which contains spaces for three other slides. To the next one is attached a mechanical device with very delicate screw-adjustments by which it can be moved in any direction. The operator at the lantern now moves the picture, as directed by an observer near the screen, until its position is identical with the first, when it is said to be "in register," and is sealed in that position. The operation is repeated until all are finished. Each frame is used as an ordinary lantern slide, but in a lantern built with a corresponding number of optical systems with provision for inserting colored glasses in the paths of light, each of which should be of a similar color to that used in taking the negative. If three positives are used, and they are equally transparent in one part of the picture, the red, green and blue lights passing through that part will appear white on the screen. If the blue positive is more opaque in that portion of the picture, the red and green lights will predominate, producing yellow; or if the green positive should be opaque, the red and blue lights in excess make purple. Thus the varying degrees of opacity in the positives caused by the selective qualities of the photographic plates and color-screens, however slight, are effective, and the resulting picture shows the delicate tints as well as the brilliant colors of nature.

For reproductions on paper by collotype or half-tone there is no greater difficulty, and the best of presswork and proper colors have combined to flood the world with "photographs in natural colors," as near as possible so far.

Joly and McDonough are experimenting in different directions for the production of photographs in colors from one plate. They rule the plate very finely, with a machine, alternating with lines of red, blue and yellow fluid colors; the printing-paper is lined, also, with similar colors. The results are promising. Kurtz, Bierstadt, Edwards, Ives, Lipmann, Lumiere, and many other industrious experimenters, are making progress in this department of photography.

Instructions now follow for the production of photographic pictures for commonplace purposes. These are gathered from the best sources, and will enable the novice to practice photography with satisfaction and pleasure.

"*Dry*"-*Plate Photography.* The introduction (1878–80) of the *gelatino-bromide emulsion process* completely revolutionized the practice of photography. By this process, dry sensitive plates, being much more rapid than those prepared by the older collodion processes, are manufactured in quantities, and stored ready for use when needed. Furthermore, when a "dry" plate has been exposed in the camera, its development and fixing may be deferred for an indefinite period, whereas collodion plates must be separately sensitized before exposure, and developed, etc., immediately afterward, which necessitates the transportation of bulky impedimenta when outdoor photography is attempted. Since its inception, the gelatino-bromide process has been modified in innumerable details, but the general principles remain the same. The commercial preparation of "dry" plates forms one of the most important of the photographic industries. The condensed description of the Paget prize method here given may be taken as representative of the process generally. Prepare two solutions, as follows: 1. Hydrochloric acid (pure), 1 fluid dram; distilled water, 12½ ounces; 2. Nelson's No. 1 gelatine, 80 grains; bromide of ammonium, 210 grains; distilled water, 3 ounces. Twenty minims of No. 1 are added to the whole of No. 2 and the gelatine left to swell. In a glass beaker 330 grains of nitrate of silver are dis-

solved in three ounces of water. Two fluid drams of this latter solution are poured into a test-tube and diluted with an equal volume of distilled water. The solution of the bromized gelatine is then completed by immersing the bottle in hot water, and the diluted nitrate of silver solution is added all at once. The bottle is then shaken, and the remainder of the strong silver solution is added in quantities of half an ounce at a time, shaking as before, after each addition. The emulsion so formed is boiled for 55 minutes, and when cooled to 90° F., one ounce of Nelson's No. 1 gelatine, which has previously been swelled and dissolved in water to make four ounces, is added. When set, the emulsion is squeezed through canvas into a pan containing three ounces of a saturated solution of bichromate of potassium in 48 ounces of water, and allowed to remain in it for an hour. The emulsion is then again squeezed through canvas into clear water, and the operation immediately repeated, it being allowed to remain in the last wash-water for thirty minutes. The addition to the emulsion of two ounces of alcohol, and sufficient water to make up the solution to twenty ounces, completes the process. When filtered, the emulsion is ready for spreading upon its support. Plates of absolutely clear glass are now coated with the sensitive solution, and placed on level shelves in a drying-closet until the films are quite dry, when they are ready for use. These operations are necessarily conducted in non-actinic light. When exposed in the camera, such plates, after development, give a "negative" image; if, however, they are exposed under a "negative" previously obtained, they yield, after development, a "positive" image. As ordinarily prepared, gelatine dry plates are not capable of giving a correct representation of the color-values of the subject photographed, being unequally sensitive to the various colors of the spectrum. The researches of Vogel and others have resulted in modifications, by which plates may be made color-sensitive; that is, capable of giving in the negative the proportionate value of the colors of the subject (see notes above). This and all other improvements are fully described in Wilson's *Cyclopædic Photography* (1895), Eder's *Handbook on Emulsion Photography* (1893), and other works.

Negative-Making. When a gelatino-bromide plate is exposed in the camera to the action of light, the sensitive film is impressioned with what is known as a latent image, i.e., an image which, though present on the surface of the film, is not apparent to the eye. By subjecting the exposed plate to the action of chemical agents known as "developers," the latent image is made to appear, or is "developed." Many substances are available for this purpose. With the first dry plates the ferrous-oxalate developer, consisting of combined solutions of neutral oxalate of potassium and sulphate of iron, was largely used. This was extensively superseded by pyrogallol, which is still, perhaps, the developing agent in general use. A simple formula for the preparation of the pyrogallol developer is as follows:

Stock Solution No. 1.

Pyrogallic acid	¾ ounces.
Sulphite of sodium	3 ounces.
Sulphuric acid (C.P.)	15 drops.
Water	40 fluid ounces.

Stock Solution No. 2.

Carbonate of sodium	3 ounces.
Bromide of potassium	8 grains.
Water	40 fluid ounces.

Filter both solutions and keep in well-corked bottles. Mix equal parts of No. 1 and No. 2 immediately before using. Four ounces of developer is sufficient for a plate 5 by 8 inches. During the past ten years new developing agents have been introduced with such frequency that it is impossible to refer to them in detail. Some of these are peculiarly adapted for special classes of work, and have other advantages. Among those in common use may be mentioned hyroquinone, eikonogen, paramidophenol, rodinal, metol, glycinamidol metacarbol. Eikonogen and metol are largely used by amateur photographers for "snap-shot" or instantaneous work. Formulas and instructions for their use may be found in almost all photographic text-books.

After the development of the image, the film still contains unaltered sensitive silver salts, and if exposed to light would darken, and be rendered useless by the obliteration of the image. To prevent this these salts are dissolved out and removed by the process of fixing. This is effected by immersing the developed plate in a solution of one part of hyposulphite of soda in four parts of water, which clears out the unaltered salts and leaves the image clear and transparent. If the exposure of the plate has been made in a camera, the lights and shadows of the subject are seen to be reversed in the plate, and it is called a "negative"; if exposed under a negative, the lights and shadows, viewed by transmitted light, appear as in the subject, and the plate is called a "positive" or "transparency."

Film-Photography. As early as 1871 the late W. B. Woodbury suggested the use of films coated with a sensitive emulsion instead of glass plates for negative-making. After the gelatino-bromide process came into general use this suggestion was taken up and now gelatine-bromide emulsions are coated upon sheets of insoluble gelatine or transparent celluloid as a support, in lieu of glass plates.

The Positive Printing Processes are generally classified into printing-out methods, which give a fully printed-out image on the sensitive surface exposed to light under a negative, and development methods, which, under similar conditions, give an invisible or faintly visible image requiring to be developed with suitable reagents until it attains its proper vigor or strength. Previous to 1880 the plain salted and albuminized paper processes were in general use, while the carbon process represented the few development methods then available. During the past 15 years co-

siderable progress has been made in this branch of photographic practice, until now the number of printing methods available is so large that a brief description of representative processes of the two classes mentioned is all that is here possible. Among the print-out processes the first place, perhaps, may be given to printing on *gelatino-chloride paper*. The first suggestion of gelatine as a vehicle to hold the sensitive silver salts on paper for printing, as a substitute for albumen, was made by Hardwich in 1856. In 1881, Wilkinson published a method for preparing gelatino-chloride paper, based on the suggestion referred to, and a year later, Abney published the earliest practical method of producing such a paper. It was not until 1885, however, that gelatino-chloride ready-sensitized paper was commercially introduced by the late J. B. Obernetter of Munich. He was followed, in 1886, by Liesegang, with a paper called "aristotype." This name is now generally used for printing-out papers of this kind. The use of aristotype papers in America began about 1889. They have, in a large measure, superseded the older kinds of print-out papers. The preparation of gelatino-chloride paper is thus described: Paper is coated with a fine layer of chalk or baryta and finished (according to the surface desired in the resulting emulsion paper) with either a mat or glossy surface. It is then uniformly coated with a film of sensitive emulsion made as follows:

A. Nelson's No. 2 gelatine ------- 240 gr. Water ---------- 4½ oz.	C. Nitrate of potassium ---------- 63 gr. Chloride of sodium ---------- 63 gr. Water ---------- 1½ oz.
B. Nitrate of silver -- 225 gr. Water ---------- 1½ oz.	

Add B to A and emulsify into C. When emulsified, add 6 drams of alcohol and 1 dram of water containing 9 grains of salicylic acid and 1 grain of chrome alum. This emulsion should be prepared and the paper coated with it and dried in non-actinic light. When dry the sensitive-coated paper is stored under light pressure, away from light, until required for use. To obtain a print, the paper is placed under a negative in a printing-frame and exposed to light until the full details of the picture are printed out. It is then washed in several changes of water until the free silver present in the film is all dissolved out. The print at this stage presents a disagreeable brick-red tone which may be changed to brown, purple or black by immersing in a toning-solution. This may be composed of water 32 ounces, chloride of gold 2 grains, made slightly alkaline by the addition of carbonate of soda. As soon as the desired tone is obtained the print is placed in a solution of diluted acetic acid (½ ounce acetic acid to a gallon of water) for a few minutes, rinsed in clear water and fixed by immersion for 15 minutes in a fixing-bath composed of hyposulphite of soda 1 ounce, water 20 ounces. This renders the print insensitive to the influence of light. After fixation it is well washed in running water for an hour, when it may be mounted and finished. A print-out paper widely used is *collodio-chloride paper*. This is very similar to gelatino-chloride paper, except that the sensitive salts are held in a collodion instead of in a gelatine film. This process was invented by G. Wharton Simpson in 1864, but, like the gelatino-chloride process, has been commercially adopted only of late years. The manipulations for its use closely resemble those already given for gelatino-chloride paper. A great variety of effects in color and finish may be obtained with either of these papers by modifications of the formula.

In 1883, Pizzighelli announced a process by which prints in platinum instead of in silver were made by a print-out method. These prints have a cold black tone, and resemble engravings. In this process a hard-surface paper is coated with arrowroot, ferric oxalate, oxalic acid, ammonium oxalate and chloro-platinite of potassium, in solution. When dry, the paper is exposed to light in the usual manner, and the image fixed by immersion in a solution of hydrochloric acid and water. Then the prints are well washed. They are then, it is claimed, "absolutely permanent."

The Gelatino-Bromide Paper Process is the best known of the development-printing methods. The sensitive surface used in this process is gelatino-bromide emulsion (see *Gelatino-Bromide Emulsion Process*, above) coated upon stout paper. It is known as bromide paper. By exposure to light under a negative, and subsequent development, it gives a black and white picture similar to an engraving, but the image is made up of a fine grain instead of the lines observable in an engraving. Being sensitive to light, bromide paper must be handled with the same precaution required in the use of dry plates. The filling of the printing-frames and all after manipulations, except the exposure, must be done in non-actinic light. The usual method followed is to expose the paper under a negative in a printing-frame at a distance of about a foot from a gas-burner of average intensity for a few seconds. It is then removed from the printing-frame (in the dark room) and immersed in clean water until it becomes limp. The invisible image obtained by exposure is now developed with almost any of the developers recommended for dry-plate work. Metol is advised, as peculiarly advantageous for bromide paper. Prepare:

1. Metol ---------- 35 gr. Water ---------- 8 oz. Add 6 drams of sulphite of sodium to above when the metol is dissolved.	2. Carbonate of potassium ---------- 6 dr. Water ---------- 8 oz.

To develop, mix equal parts of No. 1 and No. 2 and dilute with an equal volume of water. According to the duration of the exposure and the sensitiveness of the paper, varying quantities of No 1 are used, as indicated. Ferrous oxalate, amidol, hydroquinone or pyrogallol may be used instead of metol. When developed the prints are immersed in a bath composed of alum 6 ounces, citric acid 1 ounce, water 8 ounces. They are then rinsed in three or four changes of water, and fixed by immersion for five minutes in a solution

of hyposulphite of soda 4 ounces, water 20 ounces. Finally, they are washed, mounted and finished, as usual. Various processes have been suggested for changing the color of bromide prints by intensifying the image. Details of these modifications may be found in the text-books devoted to the subject. Bromide paper may also be used for obtaining large direct positives, called enlargements, from small negatives. This is done by blocking the whole of a window except a small space just large enough to take the negative to be enlarged. Place the negative in the rebate slide of the camera, usually occupied by the focusing screen, and fix the camera close up to the open space in the blocked window, so that all light entering the room comes through the negative (the lens being turned into the room). In the darkened room, at some distance from the lens, a sheet of bromide paper is tacked to a vertical stand and the image of the negative is focused upon it. The exposure is then made, after which the enlarged image obtained is developed and fixed in the usual manner.

The Platinotype Process, invented by Willis in 1878, and considerably modified in 1890, may be considered as a typical method of printing by development. The preparation of the paper used in this process has not been published, but the process is based on the reduction of ferric oxalate (by the action of light) to ferrous oxalate and the further reduction of a platinum salt by ferrous oxalate to a metallic state when wetted with a suitable developing agent. Paper is coated with a solution of ferric oxalate, oxalic acid and mercuric chloride in water. When it is dried it is exposed under a negative in the usual way and the faint image so obtained is developed by immersion in a bath of oxalate of potash and chloro-platinite of potassium in water. When developed the prints are fixed by immersion in three changes of a weak solution of hydrochloric acid and well washed.

The Kallitype Process, introduced by Nicol in 1890, is a development method based upon the action of light on the iron and silver salts in combination. In this process Rives paper is slightly sized with gelatine and sensitized by brushing the surface with a solution of ferric oxalate and nitrate of silver. The paper is exposed to light under a negative, and the faint image thus obtained is developed with a solution of borax, Rochelle salts and bichromate of potassium. It is fixed by immersion in a weak solution of ammonia, and thoroughly washed. According to the composition of the sensitizing and toning solutions the resulting prints vary in color, as red, brown or black.

Thus, briefly, a running account of photographic progress since, say, 1880 is made. This progress in the direction first named has been wonderful. When daguerreotypes were made the exposure required was half an hour. It is now difficult sometimes to divide a second into sufficiently small parts to record with one part the time taken to make the impression upon the sensitive plate.

EDWARD L. WILSON.

PHOTOGRAPHY, ASTRONOMICAL. The idea of applying the photographic method to form pictures of the heavenly bodies seems to have originated with Dr. John W. Draper, of New York. About 1843 he succeeded in taking a daguerreotype of the moon. This process was, however, too slow to be applied on a large scale to other heavenly bodies than the sun. The method, therefore, was little developed until the process now known as photography was discovered.

This process was soon applied with great success by the late Dr. L. M. Rutherford, of New York, who, in 1864, had mounted in his garden in New York City a telescope, which was especially constructed to take photographs of the heavenly bodies. His photographs of the moon soon acquired celebrity on account of their sharpness and minuteness of detail. He also showed that the same method could be applied to the exact measurement of small distances in the heavens. This was done by taking photographs of clusters of stars on glass negatives. He applied the method with the greatest success to the Pleiades. It consisted in forming a photograph of the cluster in the principal focus of his telescope. Thus on the glass plate he had an image of the Pleiades as they appeared in the heavens. He then devised an instrument for measuring the distances and relative positions of the stars found on the plate. With the aid of these measures, their positions in the heavens relative to the central star of the group, Alcyone, were determined with an accuracy rivaling the best measures hitherto made.

A farther step in the same direction was taken by the Rev. Charles Pritchard, director of the observatory at Oxford, England. By photographing a bright star surrounded by a number of faint and therefore more distant ones, at different times of the year, he was enabled, by the slight displacement of the bright star on the plate, to determine the parallax of the latter. Whether this method is as accurate as others is still an unsettled question, but there can be no doubt of its value.

When, in 1888, Professor Holden took charge of the Lick Observatory, he saw that with the unrivaled means at his command excellent work could be done in photography. He therefore invited Prof. E. E. Barnard, of Nashville, who combined most happily the two professions of photographer and astronomer, to become a member of his staff and apply his art to the heavens. The result has been an unequaled collection of photographs of celestial objects, which, at the time of writing, is in course of publication by Mr. Barnard. It was found by Gill, at the Cape of Good Hope, as far back as 1882, that with a common camera it was possible to photograph stars down to the ninth magnitude—a limit far beyond that which the naked eye could distinguish. By applying this method Barnard was en-

abled, without expensive apparatus, to make his most interesting pictures.

At the present time the most important work going on in celestial photography is the great International Photographic Chart of the Heavens. In 1886 it was found by the brothers Henry, at the Paris Observatory, that with a certain special construction of telescope it was possible to photograph all the stars in a pretty wide field of view, down to the lowest limit visible with any ordinary telescope. The plan was, therefore, devised of an international enterprise, having for its object to take photographs of the entire heavens as they appear in our time, for the use of posterity in detecting changes that may take place. Invitations were sent to astronomers interested in the subject in all parts of the world to assemble at a general convention in Paris in April, 1887. There the details of the plan were worked out by committees, and the instruments and methods to be used were decided upon. A number of observatories engaged to procure the instruments and take part in the work. The latter has been successfully prosecuted up to the present time. Several observatories have nearly completed their share; though, as might have been expected, others are far in arrears. But there is no doubt that, at no distant day, the work will be finished.

In the various fields of physical astronomy, the photographic method has proved of the greatest value. As far back as 1869 it was applied by Winlock, and others in the United States, to take photographs of the total eclipse of the sun which occurred in that year. The solar corona, with all its irregularities, was thus placed permanently on record for study. As more sensitive chemicals and more refined methods were applied in successive solar eclipses, it became possible to fix more and more details in this way. The filamentous structure of the sun's corona has thus been brought out with greater certainty than it could be by mere eye observation during the rare moments of an eclipse.

It has even been supposed possible, by some of the highest authorities, to photograph the solar corona when there was no eclipse. But it seems very doubtful whether this has actually been done or can be done. The glare of the sun's light in its immediate neighborhood is so intense as completely to obliterate the faint light of the corona; and it seems likely that the supposed corona photographs have been only those of the light diffused in the earth's atmosphere.

Another important application of photography has been the photographing of spectra of the stars and planets. As in other cases, the method has the advantage over eye observations that the observer can measure the lines on his plate at leisure with much more care and attention than he can devote to the measurements in a moving telescope. The chemicals now used are so sensitive that it seems possible to photograph at least everything that can be seen, and quite likely much that would be invisible to the naked eye. Indeed, large nebulous regions have been photographed by Barnard and Pickering in Orion and around the Pleiades, where nothing of the kind has ever been seen by the eye.

The observatory which, in recent times, has applied the photographic method to the spectroscopic study of the stars on the largest scale is that of Harvard College, under the direction of Professor E. C. Pickering. An important part of his work is a general study of the photographic spectra of the various stars. Instead of attaching a spectroscope to the eye-piece of the telescope, which is the usual method of forming the spectrum of a star, a large prism of small dispersion is placed over the object-glass. The advantage of placing the prism here is that the effect of atmospheric undulation is many times less than it would be were the prism applied to the eye-piece. Then, when the telescope is pointed at the heavens and set in motion, all the stars in the field of view are shown as so many spectra. These spectra are all photographed on the plate in the focus of the telescope. The negatives thus formed can be studied at leisure. A corps of examiners, mostly expert young women, is employed to study the innumerable images on every plate, and detect those showing any special peculiarity.

Among the noted instruments being here brought into use is the great Bruce photographic telescope, the gift of Miss C. W. Bruce, of New York. This instrument is remarkable for the shortness of its focal length as compared with its aperture. The latter is 24 inches, while the former is 11 feet. An extraordinary concentration of starlight on the plate, with a corresponding diminution of the bad effect of atmospheric undulation, is thus attained. This short focal length with such an aperture would not be successful in a telescope of ordinary construction, with only a single objective. The construction is, therefore, that of the "doublet," with two objectives, thus forming a gigantic camera. With such an instrument it is possible to photograph a region of the sky about five or six degrees in diameter without any serious loss of definition, unless at the extreme edge of the field.

Yet another application of photography at the same observatory is that of a constant watch of the sky to detect any new star which may show itself in the heavens. The apparatus for doing this consists of a small telescope, having a field of several degrees, which moves automatically by successive jumps, from horizon to horizon, and at each point photographs the principal stars on the plate in its focus. The various fields photographed are thus combined on the same plate so that it is impossible to distinguish them. But no distinction is necessary, because all that is required is to detect any new star that may appear. How often soever the telescope may pass over the same region, the same stars will be photographed upon it, and therefore the appearance presented by the plate will be the same. If, however, a new star puts in its appearance, it will be de-

tected by a comparison with the other plates just as certainly as a criminal is detected by the Bertillon measures of his head and limbs.

Notwithstanding all these advantages, the photographic method has its drawbacks. As a general rule, delicate details cannot be impressed on a photographic plate so well as they can be seen. The great foe of astronomical observation, atmospheric undulation, can be better evaded by the eye than by the unthinking plate. The astronomer who looks at the planet Mars through a telescope in order to outline the features on the surface of the planet finds that, during the greater part of the time he is looking, these features are obliterated by the undulations of our own atmosphere. He therefore waits for the moments of good definition, and takes advantage of them to make his measures and note his observations. But the photographic plate can exercise no such discrimination. It records everything as it appears, undulations and all, and thus the most delicate details fail to be developed because they are confused by the motions of the atmosphere.

There is no branch of astronomy in which the amateur can work so easily and successfully as this. As already remarked, the ordinary camera can be used to take photographs of clusters and the regions in the Milky Way, where the separate stars are wholly invisible to the naked eye. More exact work can be done with a photographic telescope of the smallest size, but this requires accurate clockwork to move it. There is, however, no difficulty in taking photographs of any star visible to the naked eye without any motion of the telescope. It must be remembered that the ordinary visual telescope is not that best adapted for photographic work. The latter requires either to have a special object-glass suitable for bringing the photographic rays to a focus, or to be supplied with a corrector, which consists of a separate lens which placed over the object-glass will enable it to produce the necessary effect of bringing the photographic rays alone to a focus.

SIMON NEWCOMB.

PHOTO-LITHOGRAPHY. See PHOTOGRAPHY, Vol. XVIII, pp. 846, 847.

PHOTOMETER. See GAS, Vol. X, p. 90.

PHOTOPHONE, same as RADIOPHONE. See TELEPHONE, Vol. XXIII, pp. 140, 145.

PHOTOSPHERE. See SUN, Vol. XXII, p. 679.

PHOTOSYNTAX OR PHOTOSYNTHESIS, a term used in plant physiology to indicate the process often called carbon-assimilation. It is the first step in the assimilation of food by green plants, and consists in the construction of a carbon-molecule, which contains hydrogen and oxygen out of carbon dioxide and water through the agency of chlorophyll and light. It is the well-nigh universal method by which organic material is constructed from inorganic material, and hence holds a very important relation to the existence of plants and animals.

PHOTOTAXIS, a term used in plant physiology to indicate a certain result of irritability to the direction of incidence of the rays of light, being a phase of heliotropism. When light falls obliquely upon the motile spores (zoöspores) of certain algæ, they arrange themselves in the water so that their long axes are parallel to the direction of incidence, this phenomenon being called phototaxis. When they move, they move in the line of incidence; if away from the source of light, they are said to be negatively phototactic; if toward the source of light, they are positively phototactic.

PHRAATES, the name of five Parthian Kings. See PERSIA, Vol. XVIII, pp. 601, 603–606, 609, 611.

PHRAGMITES. See REED, Vol. XX, p. 332.

PHRANTZES GEORGIUS. See BYZANTINE HISTORIANS, Vol. IV, p. 545.

PHRAORTES, a Median king. See PERSIA, Vol. XVIII, pp. 573, 574.

PHRAORTES, an usurper. See PERSIA, Vol. XVIII, pp. 580, 581.

PHRATRIES. See TOTEMISM, Vol. XXIII, pp. 502–504.

PHRYGIAN RELIGION AND LANGUAGE. See PHRYGIA, Vol. XVIII, p. 867.

PHRYNIDES. See ARACHNIDA, Vol. II, pp. 253–255.

PHTHA OR PTAH. See EGYPT, Vol. VII, p. 622.

PHYCOMYCETES. See FUNGUS, Vol. IX, pp. 729, 730.

PHYLLOCACTUS. See HORTICULTURE, Vol. XII, p. 275.

PHYLLOME. See BOTANY, Vol. IV, p. 96.

PHYLLOPODA. See CRUSTACEA, Vol. VI, pp. 586, 587.

PHYLLOPTERYX. See HIPPOCAMPUS, Vol. XI, p. 761.

PHYLLORHININÆ. See MAMMALIA, Vol. XV, pp. 416, 417.

PHYLLOSTOMIDÆ. See MAMMALIA, Vol. XV, pp. 418, 419.

PHYLLOTAXIS. See BOTANY, Vol. IV, pp. 103–106.

PHYLLOXERA. See VINE, Vol. XXIV, pp. 256–258.

PHYLOGENY, in natural history the study of the descent of an individual tribe. See ANCESTRY OF PLANTS and HEREDITY, both in these Supplements.

PHYSALIS, a genus of plants belonging to the family *Solanaceæ*, and closely related to the genus *Solanum*, to which the potato and tomato belong. The species of *Physalis* are commonly called ground cherries, on account of their berry-like fruit, which often resembles a cherry in color and size, and is inclosed in the persistent inflated calyx.

PHYSETERIDÆ. See MAMMALIA, Vol. XV, p. 399.

PHYSICAL EDUCATION. See GYMNASIUM, Vol. XI, pp. 310, 311; GYMNASTICS, Vol. XI, pp. 311–313.

PHYSICAL GEOGRAPHY. See GEOGRAPHY, Vol. X, pp. 188, 189.

PHYSICK, PHILIP SYNG, an American sur-

geon; born in Philadelphia, Pa., July 7, 1768. He graduated at the University of Pennsylvania in 1785, afterward studied medicine, and in 1788 went to London, where he became the private pupil of the celebrated surgeon, John Hunter, then at the zenith of his fame as an anatomist and physiologist, as well as being the leading zoologist of his day. In 1790 he was admitted as house surgeon to St. George's Hospital, London; and after residing for a year at Edinburgh he returned in 1792 to Philadelphia, and there began the practice of medicine. In 1805 he was appointed professor of surgery in the University of Pennsylvania, in 1819 was transferred to the chair of anatomy, and in 1824 was elected president of the Philadelphia Medical Society. He wrote for medical journals accounts of cases he had treated, or of processes or instruments he had invented. He has been called the father of American surgery. He died in Philadelphia, Dec. 15, 1837. E.E.T.

PHYSIOCRATS. See POLITICAL ECONOMY, Vol. XIX, pp. 372–374.

PHYSIOLOGICAL CHEMISTRY. Physiological chemistry deals with the chemical changes which go on in the structures of living organisms. It includes both plant and animal chemistry. Of course the chief interest centers in the processes going on in the human body. Yet the opportunities for studying the cause, course and result of these changes and for modifying them by experiment are so very limited in the human subject that a large part of our knowledge of human physiology has been obtained by means of observations on animals.

In recent years very extensive studies in the relative values of various foods for the support of life have been made, one of the objects in view having been the regulation of diet, so that by proper selection of foods the maintenance of life in full activity may be secured at the smallest possible expense. It is a common phenomenon to find families earning large wages purchasing their supplies so injudiciously that they are actually suffering from slow starvation in respect of certain essential elements of nourishment, such as fats, proteids or lime. The food most perfectly adapted to the early period of life is the mother's milk. The adjustment of its constituents to the work it has to do is very remarkable. The inorganic substances, such as salts of potassium, sodium, magnesium calcium, phosphorus and chlorine (excepting only iron), which dog's milk, for example, contains, are present in exactly the same proportions as in the body of the pup which it is supporting. If a similar adjustment could be maintained throughout life, much expense and much wear and tear of the digestive organs might be spared.

Among the elements present in the body, in very small amount, iodine has acquired a new significance. It has been recognized that cretinism, a condition of mental weakness and physical degeneracy common among the inhabitants of Alpine districts, is closely connected with very small development of the thyroid gland. Feeding cretins with sheep's thyroids (sweetbreads) was found to produce a wonderful amelioration of the symptoms. It now appears that iodine in some form of organic combination is an essential constituent of the healthy thyroid, and that it is the absence of this constituent which causes the disease referred to.

The organic compounds found in the body yield very slowly to chemical investigation, on account of their complex character or their instability. Some light has been thrown on the proteids. These are amorphous bodies such as blood, fibrin and casein, containing nitrogen and sulphur. Substances having very similar properties have recently been made artificially, but they do not seem to contain sulphur. If this should lead to the synthesis of a real proteid, a region of physiological chemistry at present very obscure would be brought much more completely within the range of chemical investigation. One of the most important products excreted by the animal body is uric acid, $C^5H^4N^4O^3$. In a healthy man the proportion of the nitrogen which he takes up in his food and eliminates in this way is comparatively small. Its overproduction leads to painful diseases, like gout. In animals like the cat and dog it is almost absent from the excreta, while in birds and reptiles it often forms the chief means of exit for the nitrogen. Its constitution is known, and its recent preparation artificially from aceto-acetic ether and urea must be regarded as a discovery of the first importance.

Adenine is a new base found in the substance of the cell nuclei. Its formula, $C^5H^5N^5$, indicates that it is a polymer of prussic acid. This and the three other bases found in the nuclei are interesting, as they are probably intermediate steps in the formation of urea or uric acid.

The study of the poisonous substances produced by animals and plants is of great interest from the medical point of view. Thus it is estimated that thousands of human beings perish yearly from snake-bites. A study of the effects of snake-poison has shown that careful injection of gradually increasing quantities enables the animal so treated finally to withstand doses five or six times that ordinarily sufficient to produce death. Not only so, but the blood serum of animals thus immunized acquires the properties of an antidote to the poison, and when injected into a rabbit (e.g.) with, or even after the snake-poison, entirely prevents death or even serious symptoms of any kind. The prepared serum, which has been called antivenene, seems to act chemically, destroying the harmful substances. The exact nature of the latter has not been determined, but they seem to resemble the albumens, and are called tox-albumens.

The production of poisonous secretions is not confined to animals like snakes, scorpions and spiders. In fact, death from the effects of the toxic substances produced by bacteria is far more common. Thus the bacilli of diphtheria and tetanus, and those found in putrifying organic matter, form poisons of extreme virulence. The latter are often called ptomaines. The efforts to separate pure chemical substances from liquids in which bacilli are growing, or from decaying flesh or vegetable products, have

frequently been successful. Thus, methylguanidine $NH=C<^{NH^2}_{NHCH^3}$ was isolated from horseflesh four months old, and tetramethylenediamine (putrescine) and pentamethylenediamine (cadaverine) from other decaying substances. But they were found to be either non-poisonous, as in the last two cases, or greatly inferior in this respect to the crude material from which they were extracted, as in the first. Tetanine, a base extracted from cultures of tetanus bacilli, was poisonous to the extent that 0.5 grams was fatal to a guinea-pig; but the crude organic matter contained in the filtered culture-medium was so much more virulent a poison that, in spite of its undoubtedly containing much non-poisonous matter, one twentieth of the above amount would have been sufficient to poison a thousand guinea-pigs. The most actively poisonous substances seem to have been decomposed in the process of extraction. They are regarded as being similar to the corresponding bodies in snake-poison, and are classed as tox-albumens.

ALEXANDER SMITH.

PHYSIOLOGY, ANIMAL. See EMBRYOLOGY, in these Supplements.

PHYSIOLOGY, VEGETABLE. See PHYSIOLOGY, Vol. XIX, pp. 50–72.

PHYSOSTOMI. See ICHTHYOLOGY, Vol. XII, pp. 730–733.

PHYTOPHTHIRES. See HEMIPTERA, Vol. XI, p. 576.

PHYTOZOA. See BOTANY, Vol. IV, p. 126.

PIA MATER. See ANATOMY, Vol. I, p. 760.

PIANO, ELECTRIC. The instrument known by this name is rather a piano with an automatic electric attachment. It is applicable to any ordinary form of upright piano, and is operated by a little motor, set in the base of the instrument and supplied with a current of about ten amperes and five volts. It makes use of standard perforated music, such as is manufactured for several other instruments. A music-holder containing the perforated rolls is placed directly below the keyboard, and the music-rolls are unrolled by means of belts connecting with the motor. Electric contacts are provided to connect with each note, and when the perforation for a certain note passes under its contact a circuit is closed and an electric magnet put into operation. The magnet, through the medium of several minor connecting devices ending in a striker-arm, raises the inner end of the key, and of course depresses the outer end just as a player would do. A drum, extending the whole length of the piano at the base, operates friction-shoes whenever a contact is made, and the shoe turns a bell-crank that pushes a lever against the striker-arm. The operation of the piano by hand is not interfered with in the least, and the perforated music thus mechanically rendered may be written with more notes in the chords than it would be possible for a performer to sound with ten fingers. The music is re-rolled automatically, and the speed or tempo is regulated by moving a little switch, which shifts a belt working on two cone-pulleys, so that a change in time is necessarily gradual.

C. H. COCHRANE.

PIANOGRAPH. An instrument designed to be attached to a pianoforte, and to record graphically the music played. Carpentier's prints lines of varying length, showing where holes should be cut in the sheet for its subsequent use in an electric piano or other automatic instrument. Parise's instrument is a sort of typewriter attachment, designed to print the notes as ordinarily written, except the stems, quavers, etc., which have to be added by hand. By its use a composer may read his improvisation as soon as it has been played. The arrangement consists of a series of levers extending from the keys and connecting with small rods which reach the cylinder of the pianograph proper. This cylinder bears a roll of paper, and as the player strikes the keys the rods strike the paper through an inked ribbon, making the record.

PIASSABA or PIACABA, a remarkable vegetable fiber which has become an article of much importance. It is procured from Brazil, chiefly from the ports of Para and Maranha, and is produced by one or more species of palm. That which furnishes the greater part is the coquilla-nut palm (*Attalea funifera*); but Mr. Wallace states that much of it is procured from a species of *Leopoldinia*, which he has named *L. piassaba*. This material has been found of great utility in making brushes of a coarse kind, particularly those required for sweeping streets.

PIATT, JOHN JAMES, an American poet; born in James Mill, Dearborn County, Ind., March 1, 1835. He worked as a youth in a printing office, and studied at the Capitol University, Columbus, Ohio, and at Kenyon College. From 1861 to 1867 he was a clerk in the United States Treasury Department, Washington, D. C., and was librarian of the House of Representatives from 1871 to 1875. In 1882 he was appointed United States Consul at Cork, Ireland, where he remained until 1893, when for a short period he was consul at Dublin. Meanwhile he had written much for the newspapers, being a staff contributor to the Louisville *Courier Journal* and the Cincinnati *Commercial*. He has attained considerable recognition as a minor poet. His first volume of verse, written in collaboration with W. D. Howells, and entitled *Poems of Two Friends*, was published in 1860. His other works are: *The Nests at Washington* (1863); *Poems in Sunshine and Firelight* (1866); *Western Windows* (1868); *Idyls and Lyrics of the Ohio Valley* (1884); *At the Holy Well* (1887); *Lost Hunting Ground* (1893); *The Ghost's Entry, and Other Poems* (1895); *Odes in Ohio, and Other Poems* (1897); *The Hesperian Tree* (1900).

W.M.C.

PIATT, SARAH MORGAN BRYAN, an American poet, wife of J. J. Piatt; born in Lexington, Ky., Aug. 11, 1836. She was educated at the Henry Female College, Kentucky, and early adopted literature as a profession. She has written: *A Woman's Poems* (1871); *A Voyage to the Fortunate Isles* (1874); *Poems in Company with Children* (1877); *Dramatic Persons and Moods* (1880); *The Witch in the Glass* (1888); *An*

Enchanted Castle (1893). A complete edition of her poems appeared in 1894. W.M.C.

PIATTI, ALFREDO, an Italian violoncellist; born in Bergamo, Jan. 8, 1822; had in his youth the advantage of instruction from his grand-uncle, Zanetti, and was able to begin playing in the orchestra at the age of 7. He entered the Milan Conservatoire in 1832, studied under Merighi, and made his public appearance as a solo performer in 1837. He went to England in 1844, making his first appearance at a concert of the Philharmonic Society in June of that year in a concertino by Kummer, his performance at once establishing his position in the front rank. He obtained this success notwithstanding the fact that at this concert Mendelssohn had preceded him, playing Beethoven's *PF. Concerto in G.* He and Mendelssohn played several times together in private, and Piatti is thought to have completed for Mendelssohn the first movement of a concerto for violoncello and orchestra, but the manuscript has never been found. Signor Piatti composed a concertino and two concertos for violoncello obligato of great merit.

PIAZZI, GUISEPPI, an Italian astronomer. See ASTRONOMY, Vol. II, pp. 662, 705.

PIBROCH, a form of music performed on the bagpipe of the Highlanders, including marches and dirges. Its martial character has been found to have a wonderful power in arousing their military instincts. Its rhythm is so irregular, and its notes in the quicker parts so much jumbled together, that a stranger has difficulty in following the modulations or reconciling his ear to them. The earliest mention of the military music of the bagpipe is in 1594, at the battle of Balrinnes. According to Sir Walter Scott, the connoisseurs in pipe-music affect to discover in a well-composed pibroch the imitative sounds of march, conflict, flight, pursuit, and all the current of a heavy fight. Many remarkable instances have been recorded of the effect of the pibroch on the Highlanders.

PICARD, ALFRED, civil engineer; born in Strassburg, France, Dec. 21, 1844. He was educated at the Ecole Polytechnique, became a skillful engineer of bridges and roads, and, in 1870, before the outbreak of war with Germany, distinguished himself by his great works of defence at Nancy. In 1880 he became connected with the ministry of public works, was director of railways in 1882, counselor of state the same year, and inspector-general in 1887. He presided over the committees and juries of the Exposition of 1889, and organized the Exposition of 1900. G.J.H.

PICARD, JEAN, an astronomer (1620–82). See ASTRONOMY, Vol. II, p. 659.

PICARDS. See ADAMITES, Vol. I, p. 129.

PICCOLOMINI, a famous Italian family, which was first settled in Rome, then at Sienna, and finally obtained the duchy of Amalfi. Of its members ÆNEAS SYLVIUS became Pope Pius II; ALESSANDRO (1508–78) became Bishop of Patras, and wrote various philosophical and scientific works and dramas; FRANCESCO was a Platonist philosopher, who taught for many years at Padua, Sienna and Perugia; and OTTAVIO, most noted of all, became a commander of the Austrian army in the Thirty Years' War. He was born in 1599, served under the King of Spain and the Duke of Florence, and then entered the army of Ferdinand II. At Lutzen he led the cavalry regiment in the fight which proved fatal to Gustavus Adolphus. He was a favorite of Wallenstein, but betrayed the latter's treason to the emperor, and was then commissioned to capture Wallenstein, dead or alive. Before he could do this Wallenstein was murdered by others, but Piccolomini was rewarded with a share of his estate. In 1635 he was sent to drive the French from the Netherlands, but was not so successful against the Dutch. Philip IV of Spain employed him a second time in the Netherlands, with more success than before. In 1648 he was recalled to Austria and was made a field-marshal. After the peace of Westphalia he was sent to the Convention of Nuremberg as a plenipotentiary, and for his services there and elsewhere was raised to the dignity of a prince of the Holy Roman Empire (he had hitherto been Duke of Amalfi). He died in Vienna in 1656. His name is borne by the second play in Schiller's Wallenstein trilogy, which deals with the treason of Wallenstein and Piccolomini's efforts to thwart it; but the Max Piccolomini who figures in the play is a poetic fiction, for Ottavio had no son. W.F.J.

PICEA. See FIR, Vol. IX, pp. 195, 196.

PICHICIAGO. See CHLAMYDOPHORE, Vol. V, p. 587.

PICHINCHA, a mountain. See ECUADOR, Vol. VII, p. 559.

PICHURIM BEANS, a name given to the large cotyledons of *Nectandra pichury*, a South American plant belonging to the family *Lauraceæ*. These "beans" have a sassafras-like flavor, and are used in confections.

PICIDÆ. See WOODPECKER, Vol. XXIV, p. 686.

PICKARD-CAMBRIDGE, OCTAVIUS, an English clergyman and scientist; born in Bloxworth Rectory, Dorsetshire, Nov. 3, 1828; was a student at the Middle Temple, London (1849–52), and at University College, Durham (1855–58); M.A. (1859); ordained deacon (1858), and priest (1859); became rector of Bloxworth and Winterbourne Tomson in 1868; and was elected a F.R.S. in 1887. He wrote *Spiders of Dorset* (1879–81); *Araneidea*, in *Scientific Results of the Second Yarkand Mission* (1885); *Arachnida of Kerguelen Island* (1877); and the article ARACHNIDA, in this ENCYCLOPÆDIA.

PICKENS, ANDREW, an American soldier and statesman; born in Bucks County, Pa., Sept. 13, 1739. In 1761 he was a volunteer in Grant's expedition against the Cherokees. During the Revolution he rose from captain of militia to the rank of brigadier-general, and with Marion and Sumter kept the field with a partisan corps against the British. In 1781 he subdued the Cherokees and added a large section of territory to what is now Georgia. He won a victory at Kettle Creek, and for his gallantry at the Cowpens he received a sword from Congress. He

rendered important service at Augusta, Ninety-Six, and Eutaw Springs, and negotiated a treaty with the Cherokees at Hopewell, where he soon afterward settled. He served several years in the State legislature, and was a Representative in Congress from South Carolina in 1793–95, in which latter year he was elected major-general of militia. He died in Pendleton District, S. C., Aug. 17, 1817. E.E.T.

PICKENS, Francis Wilkinson, an American statesman; born in Tagaloo, S. C., April 7, 1807. He graduated at the College of South Carolina, and in 1829 began the practice of law. He served for several years in the South Carolina legislature, and was Representative in Congress 1834–43. He was minister to Russia, 1858–60; was Confederate governor of South Carolina, and took an active part in the Civil war. He died in Edgefield, S. C., Jan. 25, 1869. E.E.T.

PICKEREL. See Pike, Vol. XIX, p. 97.

PICKERING, Charles, an American naturalist and explorer, grandson of Timothy Pickering; born in Starucca Creek, Pa., Nov. 10, 1805. He was graduated from Harvard in 1823 and from the Boston Medical College in 1825. He then removed to Philadelphia, where he became an active member of the Academy of Natural Sciences. From 1838 to 1842 he was naturalist with the Wilkes Exploring Expedition sent by the United States to South America and the South Seas, and from 1843 to 1845 he traveled in Africa and India engaged in scientific research. He was a prominent member of leading American scientific societies. His works include *The Races of Man and Their Geographical Distribution* (1848); *The Geographical Distribution of Animals and Man* (1854); *The Geographical Distribution of Plants* (1869); *Chronological History of Plants: Man's Record of His Own Existence, Illustrated through Their Names, Uses and Companionship* (1877). He died in Boston, Mass., March 17, 1878. W.M.C.

PICKERING, Edward Charles, an American astronomer; born in Boston, Mass., July 19, 1846. He was graduated from Harvard in 1865 and was instructor in mathematics at the Lawrence Scientific School from 1865 to 1867. He became professor of physics at the Massachusetts School of Technology in 1867. He observed the total eclipse of the sun on Aug. 7, 1869, when he was sent by the government to Mount Pleasant, Iowa. He was a member of the United States Coast Survey Expedition to Xeres, Spain, to observe the eclipse of December 22, 1870. In 1876 he was appointed professor of astronomy and geodesy and director of the observatory at Harvard, and under his management this observatory became one of the foremost in the United States. As an associate member of the Royal Astronomical Society of London, he was awarded, in 1886, its gold medal for his photometric researches. In 1876 he was vice-president of the American Association for the Advancement of Science. He established the first physical laboratory in the United States and was the founder of an auxiliary station in Arequipa, Peru. He has made a specialty of the study of the light and spectra of the stars, and has made a catalogue of over 4,000 stars. He has made important photometric measurements of Jupiter's satellites while they are undergoing eclipse, and of the satellites of Mars and other faint objects. He has published *Elements of Physical Manipulation* (1873). W.M.C.

PICKERING, John, an American scholar; born in Salem, Mass., Feb. 7, 1777. He graduated at Harvard in 1796. He was secretary of legation in Lisbon from 1797 to 1799, when he went to London as private secretary to Rufus King, minister to the court of St. James. In 1801 he returned to Salem and was admitted to the bar in 1804. In 1827 he removed to Boston, and in 1829 was appointed city solicitor, which office he held till shortly before his death. He took an active part in State politics, being at times a Representative from Salem in the legislature, a senator from the counties of Essex and Suffolk, and a member of the Executive Council. He was a member of the board of overseers of Harvard College from 1818 to 1824; president of the American Academy of Arts and Sciences; originator and first president of the American Oriental Society; and a member of many literary and scientific societies in Europe. He was the author of *A Vocabulary of Americanisms* (1816); *An Essay on a Uniform Orthography for the Indian Languages of North America* (1820); a *Greek and English Lexicon* (with Dr. Oliver) (1826); etc. He died in Boston, Mass., May 5, 1846. E.E.T.

PICKERING, Percival Spencer Umfreville, an English scientist; born in London, March 6, 1858; educated at Eton, from which he obtained in 1875 an exhibition in science at Balliol College, and in 1880 took first-class honors in natural science at Oxford, and was lecturer in chemistry at Bedford College in 1881–89. He was elected a fellow of the Royal Society in 1890. Wrote voluminously on subjects connected with chemistry. His writings include *The Constitution of Molecular Compounds* (1883); *The Nature of Solution* (1886); *The Thermal Phenomena of Neutralization* (1887); *The Principles of Thermochemistry* (1888); *Determinations of the Heat Capacity and Heat of Fusion of Some Substances* (1890); *The Heat of Dissolution of Gases in Liquids* (1892); *Examination of the Properties of Calcium Chloride Solutions* (1894).

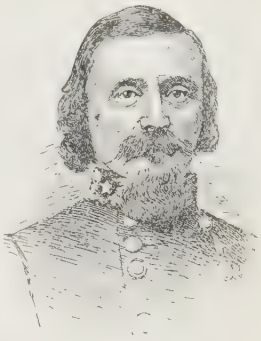
PICKERING, Timothy, an American patriot and statesman; born in Salem, Mass., July 17, 1746. He was a descendant of John Pickering, who settled in New England in 1630. He was graduated from Harvard College in 1763 and was admitted to the bar in the following year. He became register of deeds for Salem County in 1764. Taking an active part in the patriot cause, he helped organize the provisional government of Massachusetts, and was appointed judge of the Court of Common Pleas for Essex and judge of the Maritime Court for the Middle District of New England. In 1766 he was commissioned

lieutenant of militia and was promoted until in 1775 he was made a colonel. In 1773 he wrote a pamphlet called the *State of the Rights of the Colonists*, and also drafted the Salem protest against the Boston Port Bill. In 1775 he wrote *An Easy Plan of Discipline for the Militia*, a popular manual which was officially used in the Continental Army. In December, 1776, Pickering joined Washington's forces and fought in the battles of Brandywine and Germantown. In 1777 he was made adjutant-general and then quartermaster-general. Later he was a member of the Board of War and was present at Yorktown. After peace was declared he settled in the Wyoming Valley and laid out Luzerne County, Pa. He was employed in various negotiations with the Indians and concluded a treaty with the Six Nations in 1791. In 1792 he was appointed postmaster-general and in 1795 was made Secretary of War. In December of the same year he was appointed Secretary of State, retaining the portfolio until May, 1800. He was one of the founders of the United States Military Academy at West Point. In 1801 he became involved in financial troubles and returned to his old home in Massachusetts, where in 1802 he was appointed judge of the Common Pleas Court. In 1803 he was elected to the United States Senate. From 1812 to 1814 he was out of public life, but was elected to Congress in the latter year and in 1817 was a member of the Massachusetts Executive Council. He was a leader of the New England Opposition and favored the Hartford Convention. In public life he was distinguished for firmness, energy, activity and disinterestedness. He died in Salem, Mass., Jan. 29, 1829. W.M.C.

PICKERING, William Henry, an American astronomer; born in Boston, Mass., Feb. 15, 1858. He graduated at the Massachusetts Institute of Technology in 1879, and became instructor there and assistant professor at Harvard University. He led expeditions to observe total solar eclipses in Colorado, 1878; Grenada, W. I., 1886; California, 1889; Chile, 1893; and in Georgia in 1900. He established the Arequipa Station of Harvard Observatory in 1891; erected an observatory and telescope for Mr. Lowell at Flagstaff, Ariz., in 1894; and established an astronomical station for Harvard Observatory in Mandeville, Jamaica, W. I., in 1900. He is much interested in mountain climbing, and has a record of 19,400 feet and over 100 peaks. He is the author of *The Moon; Visual Observation of the Moon and Planets*; and of many astronomical reports and contributions to scientific journals. E.E.T.

PICKERSGILL, Frederick Richard, painter; born in London, England, in 1820. He became eminent as an artist, obtaining in 1842 a second prize for his *Death of King Lear*, while his *Burial of Harold at Waltham Abbey* brought him the first of three Royal Commission prizes, and was purchased for the House of Lords. A member of the Royal Academy in 1857, he was its keeper from 1873 to 1887. He died in Yarmouth, Dec. 27, 1900. G.J.H.

PICKETT, George Edward, an American soldier; born in Richmond, Va., Jan. 25, 1825. He was graduated from the United States Military Academy in 1846, and entered the Mexican War as 2nd lieutenant. He was present at the capture of the City of Mexico, distinguishing himself at Contreras, Churubusco, and Chapultepec, and was promoted to the rank of brevet captain in 1847. In 1849 he was transferred to Texas, where in 1855 he was made captain of the Ninth Infantry. He served on the frontier in Washington Territory and in 1856 occupied San Juan Island, where he prevented the landing of British troops, and received the thanks of Congress for his services. In 1861 he resigned from the Federal Army and joined the Confederate forces, being commissioned colonel and assigned to duty on the Rappahannock River. In 1862 he was promoted to brigadier-general. In the same year he was severely wounded in an engagement at Gaine's Mill. After his recovery he was promoted to major-general. In the battle of Fredericksburg his division held the center of Lee's line, and at Gettysburg in 1863 he made the gallant assault of Cemetery Ridge, famous as "Pickett's Charge." He later commanded the department of North Carolina, successfully defended Petersburg in 1864, and performed excellent service at Dinwiddie Court House and Five Forks. At the close of the war he engaged in business in Richmond, Va. He died in Norfolk, Va., July 30, 1875. W.M.C.



GEN. G. E. PICKETT.

PICKNELL, William Lamb, an American artist; born in Hinesburg, Vt., Oct. 23, 1854. He studied art in Rome from 1873 to 1875 and for two years at the École des Beaux Arts under Gérôme. He settled at Pont Aven, Brittany, where he worked five years under Robert Wylie and painted *Route de Concarneau*, a picture that established his position as an artist, and won honorable mention in the Salon of 1880. The work now hangs in the Corcoran Art Gallery. As a member of the Society of American Artists he received medals in 1881 and 1884. In the latter year he was elected a member of the Society of British Artists. His best works include *On the Border of the Marsh*, *The Fields of Kerran*, and *The Breton Peasant Girl*. His works are to be found in Paris, London, New York, Boston and other cities. He died in Marblehead, Mass., Aug. 9, 1897. W.M.C.

PICO, island. See Azores, Vol. III, p. 149.

PICOTEES. See Pink, Vol. XIX, p. 115.

PICRIC or CARBAZOTIC. See Carbolic Acid, Vol. V, p. 76.

PICRITE. See Peridote, Vol. XVIII, p. 544.

PICROTOXINE, a very poisonous bitter substance found in *Cocculus indicus* (fishberries) and

other varieties of *Anamirta*. It forms colorless needles, soluble in alcohol and hot water, but slightly soluble in cold water, ether of chloroform. It is doubtful whether it is a simple substance or a mixture. It is used externally to cure porrigo, and has been given internally or by subcutaneous injection, in epilepsy.

PICTON, Canada, a town, railway terminus and port of entry on the Bay of Quinté, Lake Ontario, in Prince Edward County, Ont., 34 miles S. W. of Kingston. It is the seat of Ontario College. Population, 1901, 3,698. C.L.S.

PICTOU, a town and the capital of Pictou County, Nova Scotia, and a port of entry on Northumberland Strait, at the head of Pictou Harbor, on the Intercolonial railroad, 113 miles N.N.E. of Halifax. It has a good harbor, coal is mined in the vicinity, and the town possesses shipyards and several manufacturing industries. Population 1901, 3,235.

PICTS. See BRITANNIA, Vol. IV, p. 319; also SCOTLAND, Vol. XXI, p. 495.

PIDGIN OR PIGEON-ENGLISH. See CANTON, Vol. V, p. 35.

PIEDMONT, a village of Mineral County, central northeastern West Virginia, 170 miles E. of Wheeling, on the north branch of the Potomac, and on the Baltimore and Ohio and the Cumberland and Pennsylvania railroads. It has repair-shops of the Baltimore and Ohio railroad, employing several hundred men; coal is mined in the vicinity. Population 1900, 2,115.

PIEDMONT PLAIN, same as ATLANTIC PLAIN. See NORTH CAROLINA, Vol. XVII, p. 572; also UNITED STATES, Vol. XXIII, pp. 842, 843.

PIERCE, GEORGE FOSTER, an American clergyman; born in Greene County, Ga., Feb. 3, 1811. He graduated at Franklin College in 1829, and studied law, but, determining to enter the ministry, was admitted to the Georgia Methodist Episcopal Conference in 1830. Thenceforward, except in the year 1834, he labored in Georgia until 1839, when he became first president of the Georgia Female College, Macon, and in 1848 was chosen president of Emory College. In 1854 he was elected bishop. He died Sept. 3, 1884. E.E.T.

PIERCE CITY, a village of Lawrence County, southwestern Missouri, 50 miles S.W. of Springfield, on the St. Louis and San Francisco railroad; has two large flour-mills, wagon-shops, limekilns, and a pottery. Population 1890, 2,511; 1900, 2,151.

PIERMONT, a village of Rockland County, southeastern New York, four miles S. of Nyack, just N. of the Palisades, on the west bank of the Hudson, and on the New York Central and Hudson River railroad; contains handsome residences, and has four churches, a pier one mile long, railroad repair-shops and an iron-foundry. Population 1900, 1,153.

PIEROLA, NICOLAS DE, Peruvian president; born at Camana, Peru, January 5, 1839. Educated at the College of Santo Torobio, Lima, he was admitted to the bar in 1860, founded a review, *El Progreso Catolico*, and in 1864 became editor of *El Tiempo*. He was made minister of finance in 1869, was accused of tampering with the funds at the end of his term, and, though acquitted, left the country. Sustained by the clerical party, he organized insurrections against the government in 1874 and 1877, being banished after the failure of the second. Permitted to return in 1879 he offered his services in the Chilean War, and after the defeat of General Prado proclaimed himself dictator, and continued the war. After a period of resistance to Chile he was overthrown by a military revolt, and took refuge in the United States. Returning in 1882 he was a candidate for the presidency in 1890, but was defeated, and was arrested and imprisoned for attempting to excite a riot in Lima in connection with the election. A new revolution in 1896 carried him to the presidency, which office he held until 1899. G.J.H.

PIERPONT, JOHN, clergyman; born in Litchfield, Conn., April 6, 1785; was graduated at Yale College in 1804, and became tutor in the family of Col. William Allston of South Carolina. Returning to Litchfield in 1809, he studied law, and was admitted to the bar in 1812. After practicing for a time, ill health obliged him to give up the profession, and he became a merchant in Boston and afterward in Baltimore. Unsuccessful in this, he engaged in the study of theology in 1816, and in 1819 was ordained pastor of the Hillis Street Church in Boston, where he remained till 1845. He was an ardent advocate of the abolition of slavery, and of legislation for prohibition and against imprisonment for debt. His views on these subjects caused a controversy in his parish, which continued for some years. After exonerating himself, he withdrew, and was afterward pastor of the Unitarian Church at Troy, N. Y., and of the Congregational Church at Medford, Mass. During the Civil War he was chaplain of a Massachusetts regiment and afterward a clerk in the treasury department. He published *Airs from Palestine*, etc. He died at Medford, Mass., Aug. 26, 1866. G.J.H.

PIERRE, a city and the capital of South Dakota and of Hughes County, in the central part of the state, on the Missouri, at the mouth of the Bad River, and on the Chicago and North-Western railroad. Originally there was an Indian post here, but the town was settled several years ago, and after a stubborn contest Pierre was designated as the permanent capital of the new state of South Dakota. Buildings for the accommodation of the legislature and the state officers have been erected; a United States Indian Industrial School and Pierre University (Presbyterian) are located here. In 1895 the latter institution had 11 instructors and 98 students. Population 1890, 3,235; 1900, 2,306.

PIERREPONT, EDWARD, an American geographer and diplomat; son of Edwards Pierrepont; born in New York City, June 30, 1860. He was educated in England, graduating from Oxford in 1882. In 1883 he studied at the Columbia Law School and was admitted to the New York bar. In 1884 he published *From Fifth Avenue to Alaska*, the result of an exploration trip to the Northwest. He was elected a member of the Royal Geographical Society of London in 1884,

and was a member of various other societies. In November of that year he was appointed secretary to the United States legation at Rome, being made *chargé d'affaires* in January, 1885. He died in Rome, Italy, April 16, 1885. W.M.C.

PIERREPONT, EDWARDS, an American jurist and diplomat; grandson of James Pierrepont; born in New Haven, Conn., March 4, 1817. He was graduated from Yale in 1837 and was admitted to the bar in 1840. He then established a law practice in Cincinnati, Ohio, where he remained until 1845, when he removed to New York. In 1847 he was elected judge of the superior court of the city of New York, resigning in 1860. In 1862 he was appointed by President Lincoln to conduct with John A. Dix, the trials of the prisoners of state, and in 1864 actively supported Lincoln in the Presidential campaign. He was prosecutor for the government of John H. Surratt, indicted for complicity in the assassination of Lincoln. In 1869 he was appointed United States district attorney for the southern district of New York. In 1870 he was one of the local investigating committee of 70 which fought the Tweed political ring, and in 1875, became attorney-general of the United States, which office he resigned in 1876 to accept the appointment of minister to England. In 1877, he received the degree of D.C.L. from Oxford. In 1878 he returned to New York and resumed his law practice. He died in New York, March 6, 1892. W.M.C.

PIERREPONT, HENRY EVELYN, an American capitalist; son of H. B. Pierrepont; born in Brooklyn, N. Y., Aug. 8, 1808. He was educated in Europe, returning in 1833 to manage his father's extensive Long Island estate. He was appointed a commissioner to prepare plans for laying out the city of Brooklyn, and obtained the original state charter for the Brooklyn Cemetery Company. He died in Brooklyn, N. Y., March 28, 1888. W.M.C.

PIERREPONT, HEZEKIAH BEERS, an American merchant and financier; grandson of James Pierrepont; born in New Haven, Conn., Jan., 1768. He was given a commercial education, and amassed a considerable fortune in banking and financiering government securities. He then founded an extensive shipping trade with South America and European countries. In 1804 he purchased an extensive tract of land on Long Island, retired to his estate and developed his properties. A large part of the Pierrepont estate afterward became the business section of Brooklyn. He died in Brooklyn, N. Y., May 6, 1838. W.M.C.

PIERREPONT, JAMES, an American clergyman; son of James Pierrepont, of London, who settled in Roxbury, Mass., in 1642; born in Roxbury, Mass., in 1659. He was graduated from Harvard in 1681, and was ordained to the ministry July 2, 1685. He was one of the founders of Yale College and was the author of Articles of Discipline, adopted with the Saybrook platform in 1708. His daughter Sarah, married Jonathan Edwards. He died in New Haven, Conn., Nov. 22, 1714. W.M.C.

PIERREPONT, WILLIAM CONSTABLE, an American mathematician; son of H. B. Pierrepont; born in New York City, Oct. 3, 1803. He was given a commercial education and received from Hobart College a degree of LL.D. in 1871. He early developed a genius for mathematics in which field he became celebrated both at home and abroad, and in his later years was a correspondent of the most famous mathematicians in Europe. He died in Jefferson County, N. Y., Dec. 20, 1885. W.M.C.

PIERS. See HARBORS and DOCKS, Vol. XI, pp. 407; also BRIDGES, Vol. IV, pp. 291–294.

PIERSON, ARTHUR TAPPAN, clergyman; born in New York, March 6, 1837. He was graduated at Hamilton College in 1857; and after ordination held pastorates in West Winsted, Conn., Binghamton and Waterford, N.Y., Detroit, Mich., Indianapolis, Ind., Philadelphia, Pa., and in London. He was lecturer on missions at Rutgers College in 1891 and in Scotland in 1892. He is the editor of *Missionary Review of the World*, and author of *Crisis of Missions; Divine Enterprise of Missions; Miracles of Missions; New Acts of the Apostles; Many Infallible Proofs; Evangelistic Works; Life of Power; Lessons in the School of Prayer; Shall We Continue in Sin?; In Christ Jesus; Catharine of Sienna; George Müller of Bristol; Divine Art of Preaching; The Gordian Knot*, etc. He received the degrees of A.M. and D.D. from Knox College. G.J.H.

PIETERMARITZBURG, the capital of Natal, South Africa; situated in a plain watered by a tributary of the Umgeni; connected by rail with the Orange Free State and the Transvaal. The town takes its name from its Boer founders, Pieter Retisf and Gert Maritz. It is an English archbishop's see, and as the metropolis of the colony has a government house and other good public buildings. In the Boer war (1899–1902), the town was the official military base for the British operations in Natal. Population (1900), 28,500, of whom half are whites.

PIEZOMETER, a device for measuring the effects of pressure on fluids; as a gauge for insertion into a water-pipe, the rise of the water in the gauge indicating the pressure of the water at the point of insertion; or a sounding-apparatus in which the pressure of water upon an air-tube gives the means of determining the depth to which the apparatus has descended. The name is also applied to a device for measuring the pressure of an explosion within a gun.

The Danish scientist, H. C. Oersted, invented a piezometer for measuring the compressibility of liquids, which was improved by Regnault. In Oersted's device there was a strong cylinder of glass, at the top of which was a piston working downward in it by means of a screw. Into this cylinder a jar was introduced, the neck of which

was elongated into a graduated capillary tube. This jar is to hold the liquid to be tested, which should fill it nearly to the graduated tube. A manometer is suspended in the cylinder, which, in turn, is filled with water. By turning the screw the piston is forced down upon the water, and the pressure thus created acts upon the liquid in the jar. The descent of the air-bubble in the graduated tube indicates the compression of the liquid in the jar, and the rise of water in Oersted's device, or of mercury in Regnault's in the manometer, indicates the pressure exerted by the piston. For greater accuracy a thermometer may be introduced into the cylinder for reading the temperature under pressure. In Regnault's device, where the pressure to be exerted is too great for the resistance of glass, steel tubes are employed, and the rise of the mercury in the manometer may be read by having it pass along a thin gold plating. The reading is from the extent to which the gold is amalgamated by contact with the mercury. See also MANOMETER, Vol. XV, pp. 502–503.

PIGAFETTA, ANTONIO, an Italian traveler (1491–1534). See MAGELLAN, Vol. XV, p. 199 (note).

PIGEON–ENGLISH. See CANTON, Vol. V, p. 35.

PIGEON–PEA, a popular name applied to species of *Cajanus*, a tropical genus of *Leguminosæ*, closely related to the true beans, and valued as a food-plant.

PIGMENTATION. See ANATOMY, Vol. I, p. 747.

PIGMY–APE. A name sometimes applied to the Barbary ape (*Onuus ecuadatus*); also called magot. It inhabits northern Africa, and a few still exist on the Rock of Gibraltar, the only wild monkeys in Europe. These apes are gregarious, and bands often do great damage to gardens and grain-fields. See SPAIN, Vol. XXII, p. 311.

PIGOTT THE FORGER. See HOME RULE, in these Supplements.

PIGWEED, a popular name given to the species of *Chenopodium*, a genus of notable weeds. The species are more commonly spoken of as "goose-foot."

PIKE, a long shaft or pole with metal head, carried by foot-soldiers in early and mediæval times. The pikes of the Macedonians were 24 feet in length; those of later times were from 12 to 14 feet long. The pike was used for thrusting; and as a defense against cavalry it was very effective on account of its length and rigidity. A depth of several men was necessary for its successful use, and this was decidedly disadvantageous when powder was introduced, as it gave too great an exposure of men to the enemy. The place of the pike was taken by a more effective weapon, the bayonet.

PIKE, ALBERT, lawyer; born in Boston, Mass., Dec. 29, 1809. He was educated in Harvard College and continued his studies while teaching at Fairhaven and Newburyport. In 1832 he traveled widely in the Southwest, describing his adventures in 1834 in his *Prose Sketches and Poems*. He was admitted to the bar in Arkansas in 1835 and practiced till the beginning of the Mexican War, for which he recruited a company of cavalry, taking part in the battle of Buena Vista. He was admitted to the bar of the Supreme Court of the United States in 1849, at the same time with Abraham Lincoln and Hannibal Hamlin. From 1853 to 1857 he practiced in New Orleans, returning to Arkansas in the latter year. For many years he was counsel for the Choctaw Indians, and in 1859 took an active part in procuring them an award of nearly $3,000,000 from the United States Senate. He was the first to propose a Pacific railroad convention, and was active in forwarding this project. During the Civil War he sought to obtain the adhesion to the Confederacy of the Indian Territory tribes, and commanded a brigade of Cherokees at the battle of Pea Ridge. After being for a short time on the Superior Court bench of Arkansas, he edited the Memphis *Appeal*, and in 1868 removed to Washington and engaged in legal practice until 1880, after which date he devoted himself to literary pursuits and to Free Masonry, in which he was the highest dignitary in the United States. He published several volumes of poems, also law reports and Masonic works. He died in Washington, D. C., April 2, 1891. G.J.H.

ALBERT PIKE.

PIKE, ZEBULON MONTGOMERY, military officer; born in Lamberton, N. J., Feb. 5, 1779. Becoming an officer in the army, he was sent by the government in 1805 to discover the headwaters of the Mississippi, and afterward led an exploring party into the Far West, discovering Pike's Peak, and having many adventures. He was promoted to colonel in 1810, and brigadier-general in 1813, and took part in the expedition against York, where he was wounded, dying April 27, 1813. G.J.H.

PIKE'S PEAK, a peak in the Rocky Mountains, in El Paso County, near Colorado Springs, Colorado, 75 miles S. of Denver; lat. 38° 50′ 27″ N., long. 105° 2′ 26″ W., altitude 14,147 feet. It was discovered in 1806 by General Zebulon Montgomery Pike, who was engaged in explorations concerning the source of the Mississippi River. It commands a magnificent view of surrounding mountains within a radius of 100 miles, within which are numerous lakes, and the sources of the Platte, Arkansas, Rio Grande and Colorado (of California) rivers. From 1842 until 1888 there was located upon it a meteorological station of the United States Weather Bureau, which was re-occupied in 1892. In 1891 a mountain railway was opened connecting the Peak with Manitou Springs at its foot, a noted resort for tourists. In 1858 deposits of gold were found on its slopes, which discoveries created great ex-

citement. This was the first discovery of gold in that region, and led to an immense influx of population and to the founding of the city of Denver. See also MOUNTAIN RAILWAYS, in these Supplements.

PILASTER. See ARCHITECTURE, Vol. II, p. 413.

PILCOMAYO, a river. See PLATE, Vol. XIX, p. 199.

PILE-DRIVING. See HARBORS and DOCKS, Vol. XI, p. 415.

PILES. See HÆMORRHOIDS, Vol. XI, p. 327.

PILGRIM FATHERS, THE, the name generally given to the first settlers in Massachusetts. The story of the Pilgrim Fathers is one of the glorious chronicles of the American nation, and reverts to the period when a body of worshipers, belonging to the church of England, yet alienated from its ritual, at Scrooby, in Nottinghamshire, determined to worship without the interposition of any ritualistic forms, and with no restrictions in the study of the scriptures or the practice of its precepts according to their understanding thereof. They repudiated, moreover, the state control of the church, and civil and ecclesiastical restraints of any kind in regard to religion. This particular body was stigmatized as separatists and schismatists by the church-Puritans of the same time. The worship as professed by the Scrooby body was forbidden by law under severe penalties of imprisonment and even death; but although greatly persecuted, they made their worship a matter of conscience. Thus a great difference existed between them and the Puritans, who, while requiring a purer form of religion, desired their worship and church to be protected by law. The Scrooby independents came, in 1606, to be in great danger lest their private services should be discovered. For a while they received aid and shelter from William Brewster (q.v., in these Supplements), who with John Robinson (noted as their pastor) were the leaders of the movement which led to their leaving England and seeking an asylum in Holland. After many betrayals and persecutions, this was accomplished in the spring of 1608, Amsterdam being reached in the fall. At Amsterdam they found a company of non-church worshipers, similar to themselves, from Gainsborough, in Yorkshire. But these held views much more rigid than did Brewster and Robinson and their followers. The result was, that in 1609 the latter moved to Leyden, where their more tolerant and charitable opinions would not be a source of contention between the two parties. The Pilgrims, as they may now be called, resided eleven years in Leyden, and during that time established themselves as an industrious community. They had a large house which they used as a church, around which they erected 21 cottages for 25 families. But they found Holland, and particularly Leyden, a forbidding, hard place wherein to cultivate religious freedom. This, among other causes (chief among which might be mentioned what Robinson called the "raging plague" of Dutch doctrinal disputatiousness), led them to look for a place where they could worship in peace.

The eyes of the Pilgrims were instinctively turned toward the broad Atlantic and to the distant and little-known land called America. Thus, in 1617, Robert Cushman and John Carver proceeded to England to negotiate with the Virginia Company to make a settlement in the company's territory. Arrangements were concluded, and in the early part of 1620 the pioneer fathers embarked in the *Speedwell* at Delfthaven, for Southampton, arriving there safely after a quick voyage. At Southampton lay the *Mayflower*—to become ever patriotically revered—ready to receive them. It was intended to send the two ships together, and they were accordingly prepared and their passengers (among whom were some others beside the Pilgrims from Leyden, as well as some adventurers) put on board. On the fifth day of August a start was made by the two vessels, but on account of some trouble with the *Speedwell* they had to put in at Dartmouth, and return to Plymouth for repairs. There it was determined to reduce the number of emigrants to one hundred besides the sailors, so as to accommodate all in one ship. Finally, on September 9th, the precious *Mayflower* put out on her fateful voyage. The following is a list of those who were passengers on the *Mayflower:* John Carver, chosen first governor, and Katherine, his wife; Desire Minter; William Brewster, ruling elder, Mary, his wife, and Love and Wrestling Brewster, his sons; Edward Winslow, sometime governor, and Elizabeth, his wife; William Bradford, second governor, and Dorothy, his wife; Isaac Allerton, Mary, his wife, Bartholomew, his son, and Remember and Mary, his daughters; Samuel Fuller, physician; Captain Myles Standish and Rose, his wife; John Alden; Christopher Martin, his wife, Joseph, his son, and Priscilla, his daughter; William White, his wife Susanna, and son Resolved; Stephen Hopkins, his wife Elizabeth, Giles and Damaris, his sons, and Constantia and Oceanus, his daughters; Richard Warren; John Billington, his wife Ellen, and John and Francis, his sons; Edward Tillie, his wife Ann, and daughter Elizabeth; John Tillie and family (3); Francis Cooke; Thomas Rogers and son Joseph; Thomas Tinker, his wife and son; John Ridgdale and wife Alice; James Chilton, his wife and daughter Mary; Edward Fuller, his wife and son Samuel; John Turner and two sons; Francis Eaton and wife Sarah; John Howland, Roger Williams, George Soule, John Crackston and his son John, Edward Doty, Edward Lister, John Goodman, Thomas Williams, Digerie Priest, Edmund Margerson, Richard Britteringe, Richard Clark, Peter Brown, Richard Gardiner, Gilbert Winslow and John Allerton. Brewster was placed in charge as assistant minister. Robinson remained behind at Leyden with the larger number of his flock, intending to follow at an early period. He had bidden his friends God-speed in a memorable ser-

mon; it was a farewell, for he was never able to follow his adventurous friends.

After a tempestuous voyage the long-suffering Pilgrims neared their journey's end. Their point of debarkation was to have been a point near the Hudson River, but they were driven north by the wind, so that the voyagers skirted along Cape Cod, and on Nov. 11th (o.s.), 1620, dropped anchor off a place afterward known as Provincetown. They then explored the coast, and subsequently landed at what was afterwards known as Plymouth Rock (q.v., in these Supplements), December 11th, (o.s.). Before landing, a remarkable compact was drawn up, stating how the colony was to be conducted, in which John Carver was named governor; the document being signed by 41 men representing the total number of Pilgrims. This memorable day (see FOREFATHERS' DAY, in these Supplements) is now celebrated annually on December 22d throughout the New England and Middle states. The colony suffered unparalleled hardships during the winter. The first cheering sight they obtained was in April, when they discovered some "modest, simple and sweet" blossoms, which they called Mayflowers —possibly suggested by their good ship, and as reminding them of the Mayflowerings of their now far-away homes. After their severe winter's experience, such as "promise of May" must have been cheeringly inspiring.

Meanwhile no report of the terrible experiences of the solitary colony cooled the ardor of Robinson and his remaining members at Leyden. They were eager to set out to join their friends. But the church-Puritan stockholders in London constantly put obstacles in the way of their accomplishing their design, and Robinson died March 1, 1625. In 1628 the leading men of the Plymouth colony bought out the London stockholders, making the colony desirably free of any restrictions emanating from abroad. Brewster was the mainstay of the colony until his death, April 10, 1644.

In the meantime, two colonies arrived in 1622 and the year following, but failed, their remnants afterward settling at Salem. Then John Endicott's colony arrived in 1628, settling at Salem, Francis Higginson's in 1629, and John Winthrop's in 1630. These were all connected, and obtained a grant on Massachusetts Bay, and also a charter, Winthrop being appointed governor. The number of new-comers in these three colonies was over twenty thousand. They were church-Puritans, and must not be confounded with the Independents or Pilgrim Fathers.

William Bradford wrote the journal of the experiences of the Pilgrims, which is one of the most interesting records of human struggle ever penned. Besides Forefathers' Day, the Pilgrims are remembered by a monument at Plymouth, and a Pilgrims' Society which built a Pilgrims' Hall. See PLYMOUTH and PLYMOUTH ROCK, in these Supplements.

PILLAR-SAINTS OR STYLITES. See MONACHISM, Vol. XVI, p. 727.

PILLARS OF HERCULES. See GIBRALTAR, Vol. X, p. 523.

PILLING, JAMES CONSTANTINE, ethnologist; born in Washington, D. C., Nov. 16, 1846. He was educated in Gonzago College, became a skilled stenographer, and in early manhood made the acquaintance of Major Powell, whom he aided in geological field work, in which he gained an interest in the Indians and their languages. For several years he was chief clerk of the Bureau of American Ethnology and also of the United States Geological Survey, and while thus engaged accumulated a large store of bibliographical material, to the development of which his later life was devoted, he becoming a bibliographer of notable acumen. For years he was a sufferer from locomotor ataxia, but despite this he became an industrious and erudite student of literature relating to the native American languages, of which he prepared elaborate bibliographies. In 1885 he published a bibliography of the languages of the North American Indians, and subsequently bibliographies of the Eskimo, the Sioux, the Moskhogean, the Algonquin, the Athapascan, the Chinook, the Salishan and the Wakashan languages. He died in Washington, D. C., July 26, 1895. G.J.H.

PILLOW, GIDEON JOHNSON, an American soldier; born in Tennessee, June 8, 1806. He was graduated at the University of Tennessee, studied law and was admitted to the bar in 1829. He settled in Columbia and became prominent in Democratic politics. In 1844 he was sent as a delegate to the National Convention which nominated Polk for the Presidency. At the outbreak of the Mexican War he was appointed a brigadier-general. He was a conspicuous figure at Vera Cruz, was severely wounded at Cerro Gordo, afterward became second in command to General Scott, was again wounded at Churubusco, and at the close of the war was accused by Scott of insubordination, but was eventually acquitted, and honorably discharged. He was made a major-general in 1847. He returned to his law practice after the war and at the beginning of the Civil War was made a major-general of Tennessee troops and raised 3,500 men. He advanced to the treasury department of the Confederate government considerable money which was never returned. He fought under Gen. Polk at Belmont, Nov. 7, 1861, and was second in command at the battle of Fort Donelson. He was financially ruined by the war and died in retirement in Lee County, Arkansas, October 6, 1878. W.M.C.

PILOT KNOB, a village of Iron County, southeastern Missouri, 80 miles N.W. of Charleston, on the St. Louis, Iron Mountain and Southern railroad. There is a remarkable hill here which is almost a solid mass of excellent iron-ore. The village has a large iron-smelting furnace. Population 1900, 455.

PILOT-SNAKE (*Coluber obsoletus*), a large non-venomous snake, of the Eastern and Southern states, principally of the Alleghany Mountains

It is often called the mountain black-snake. It differs from the ordinary black-snake (*Bascanium constrictor*), in that the scales of *Bascanium* are smooth, while the scales of the pilot-snake are ridged.

PILOTY, Carl Theodor von, a German realistic painter; born in Munich, Oct. 1, 1826. He studied under his father, Theodor Piloty, a lithographer, and then entered the academy of his native town. He visited Venice in 1847, and Leipsic in 1849, and afterward Paris, London and Brussels. In 1854 he completed his great historical work, *The Elector Maximilian I Adhering to the Catholic League in 1609;* and the following year produced his *Seni before the Dead Wallenstein.* In 1856 he was appointed professor in the Munich Academy, and in 1874, director. He received a medal at Paris in 1857. His *Nero Walking among the Ruins of Rome* (1861) is intensely real, and is in the National Museum at Pesth; *The Entry of Godfrey de Bouillon into Jerusalem* is in the Maximilaneum at Munich (1862); *Galileo in Prison* is in the Cologne Museum (1864); *Columbus Discovering Land* is in the Schack gallery, Munich (1866); *Thusnelda at the Triumph of Germanicus*, purchased for 35,000 florins, is in the New Pinakothek, Munich (1873); *Wallenstein Marching against Eger* was exhibited at the Paris Exposition (1878); *The Death of Alexander the Great* is in the National Gallery at Berlin (1886). Piloty had a number of pupils, who afterward disputed with him the honors of the school he founded. His *Elizabeth and Frederick Receiving News of the Loss of the Battle of Prague* (1868) is owned in Cincinnati; his *Wise and Foolish Virgins* (1881) was exhibited in the chief cities of the United States (1887–88). He was the teacher of Hans Makart. Died in Munich, July 21, 1886.

PILPAY, fables. See Bidpai, Vol. III, p. 576.

PILS, Isidore Alexander Augustin, a French historical painter; born in Paris, July 13, 1813; was a pupil of François Picot, and graduated at the L'École des Beaux-Arts. He won the prix de Rome in 1838 with his *St. Peter Healing the Cripple at the Gate of the Temple.* His work has been called "coarse and vulgar," but he was popular, as the honors showered upon him prove. He received numerous medals; was made an officer of the Legion of Honor in 1867; elected a member of the Institute in 1868, and became professor of painting at his school. Among his works are *Death of Mary Magdalene* (1847); *Rouget de l'Isle Singing the Marseillaise for the First Time*, one of his best efforts (1849); *A Trench Before Sebastopol* (1855); *Disembarking of French Troops in the Crimea* (1858); *Defile of Zouaves in the Trench before Sabastopol* (1859); *Battle of Alma*, perhaps the work by which he will be most remembered (1861). He died Sept. 2, 1875.

PIMAS INDIANS, a linguistic stock of North American Indians, embracing numerous divisions, including the Pimas proper, Papagoes, Sobaipuris, Nevomes (Lower Pimas), Opatas, Tarahumars, Cahitas, Coras and Tepehuans. The Pimas proper call themselves A'kemorl-Ohtan, meaning a river people. Some authorities regard the Pimas, thus defined, as forming a part of a greater linguistic group, including the Shosonean, Piman and Aztec or Nahuatl tribes. They are distributed over a region extending from the Salado and Gila rivers, in southern Arizona, and over a wide area in northwestern Mexico, including most of the territory of the states of Sonora, Chihuahua, Sinaloa and Durango, and parts of Jalisco and Zacatecas. The Pimas are mostly non-nomadic, are good farmers, and have been self-supporting. The Gila reservation comprises 357,120 acres, on it being 3,723 Pimas and 202 Maricopas. The agency headquarters are located upon it, 15 miles due north of Casa Grande, Arizona. The crops are produced by irrigation, but the water-supply has become a serious problem in the reservation, on account of the decrease in quantity after January. The Salt River reservation embraces 46,720 acres near Tempe, Arizona, with 543 Pimas and 93 Maricopas. They have plenty of tillable land and water. The Gila Bend reservation, in Maricopa County, embraces 22,391 acres, with 75 Papagoes. Water is scarce on the reservation, on account of the canal and reservoir company being in the hands of a receiver. The San Xavier reservation, located about 9 miles from Tucson, Arizona, 41,600 acres of which were allotted to 517 Papagoes. A day school is conducted by the Sisters of St. Joseph. The old mission of San Xavier del Bac is located on this reservation. The farm of J. M. Berger, lying in the center of the reservation, is a model, being well kept and cultivated. The nomadic Papagoes are scattered over a vast territory. In the vicinity of Peerless Well there is a village with 246 Indians of this class. Of all these Indians the Maricopas are the most intelligent, but least inclined to work. The religious work of the agency is in good hands, but the facilities are far from adequate. A boarding-school exists at the agency headquarters.

PIMPERNEL, the popular name of species of *Anagallis*, a genus of *Primulaceæ*, or primroses. They are low herbs of the Old World, naturalized in America, with pale ovate leaves, red, blue or white wheel-shaped flowers which close at the approach of rain, and pods opening by a lid. An allied genus (*Samolus*) is known as water-pimpernel.

PINAR DEL RIO, a province of Cuba. Population 1900, 173,064.

PINCHBACK, Pinckney Benton Stewart, an American lawyer and politician; born in Macon, Ga., May 10, 1837. He is of African descent, and received a common-school education at Cincinnati, Ohio. He served in the Union army, as captain of the Louisiana National Guards, in 1862–63; was a delegate to the Louisiana Reconstruction Convention in 1867; State senator from 1868 to 1871; lieutenant-governor and president *pro tempore* of the State Senate, 1871–72; and acting governor, 1872. During the Reconstruction troubles he was elected Representative in Congress from Louisiana in Novem-

ber, 1872, and was afterward nominated by one of the rival legislatures for the United States senatorship for the term 1873–79; but, on contest, the case was decided against him, March 8, 1876. He was a delegate to the Louisiana Constitutional convention of 1879, and surveyor of customs at New Orleans in 1882, having been appointed to that office by President Arthur. He then engaged in law practice, though he has now retired therefrom, and has been a delegate to every national Republican convention since 1868. E.E.T.

PINCKNEY, Charles, an American statesman; born in Charleston, South Carolina, March 9, 1758. He was admitted to the bar in 1779, was a delegate to the Continental Congresses (1777–78 and 1784–87); a delegate to the Federal convention of 1787; governor of South Carolina (1789–92 and 1796–98); United States Senator —Democrat—(1797–1801); minister to Spain (1803–05); governor of South Carolina (1806–08); member of the state legislature (1810–14), and member of the House of Representatives (1819–21). He died in Charleston, Feb. 25, 1822.

PINCKNEY, Charles Cotesworth, soldier and statesman; born in Charleston, S. C., Feb. 22, 1746. He was educated at Westminster and Oxford, England, read law at the Temple in London, and in 1769 entered upon the practice of law at Charleston. During the Revolutionary War he served as captain and afterward as colonel, fighting at Fort Moultrie, Brandywine and Germantown, and in the defence of Charleston in 1779. When that city surrendered in 1780, he was made prisoner. He was a member of the Constitutional Convention of 1787, and in 1796 was sent to France as United States Minister, adopting there a strong attitude which caused the Directory to order him from the country. His patriotic saying: "Millions for defence; not one cent for tribute," has won him fame. He was made major-general on his return, and in 1800 was a candidate for the Vice-Presidency. He died in Charleston, Aug. 16, 1825. G.J.H.

PINCKNEYVILLE, a village and the capital of Perry County, south-central Illinois, 59 miles S.E. of St. Louis, on the St. Louis, Alton and Terre Haute and the Wabash, Chester and Western railroads; has two flour-mills and manufactures of plows, carriages and lumber; coal-mines are being operated near this place. Population 1890, 1,298; 1900, 2,357.

PINDAR, Peter. See Wolcott, Vol. XXIV, p. 661.

PINEAL EYE or PARIETAL EYE, the name now applied to the pineal gland, or epiphysis of comparative anatomy, on account of its eye-like structure in certain of the lower vertebrates. See also Anatomy, Vol. I, p. 770; and Sense-Organs, in these Supplements.

PINE AND PINE LUMBERING IN THE UNITED STATES. (For a description of various species of pine trees, see Pine, Vol. XIX, pp. 110–114.) There are upward of twenty varieties of pine in the United States, of which number only about six are of more than local importance to the lumbering industry. First, and most important, is the white pine, (*Pinus Strobus*), which is found in the region of the Great Lakes and the St. Lawrence, extending into Maine and Canada. It reaches its greatest perfection in the upper lake region of Michigan, Wisconsin and Minnesota, where it forms extensive forests and reaches a height of 75 to 150 feet, and sometimes a girth of 10 to 12 feet. The timber produced from this tree is straight-grained, soft and light, of a whiter color, freer from pitch or resin and more easily and economically worked than any other, and is therefore more largely manufactured than the product of any other American tree. Perhaps the next in importance, of the northern trees at least, is the Norway pine (*Pinus resinosa*), otherwise known as the red or Canadian pine. This tree, also, is at its best in northern Wisconsin and Minnesota, but is found throughout Canada and to some slight extent in northern New England. It reaches the height (though seldom the girth) of the largest white pines, is heavy and resinous, and very hard, tough and elastic. For timbering, masts, spars and piling it is superior to white pine, but less desirable for fine work.

Of perhaps even wider commercial importance than the Norway pine is the yellow pine, of which, in the Southern states, there are two varieties: the *Pinus mitis*, or short-leafed pine, which ranges from southern New Jersey through the Southern states to Arkansas and Texas, and is known, commercially, as the Arkansas or Georgia pine; and the *Pinus palustris*, or long-leafed pine, which is confined to a strip along the coast from Texas to Virginia. Both woods are of dark yellow to orange color, are hard, heavy and tough, and the long-leafed variety is especially desired for timbering and ship-building. The short-leafed or Arkansas pine is finding a market in the middle Northern states, in competition with the white pine. The two other species of large commercial importance are Pacific Coast trees. The best-known is the Oregon pine (*Pseudotsuga Douglasii*), otherwise called the Douglas pine or fir, which ranges from British Columbia to the border of Mexico, and is at its best in Oregon and Washington, where it often reaches a height of three hundred feet, and exists in great forests. The wood is yellow in color, is hard, strong and durable, and is used for all kinds of construction. Quantities are sent to foreign countries for ship-building. There is also a somewhat inferior variety, known as red fir. The next in importance to the Douglas pine is *Pinus ponderosa*, a tree of the yellow-pine species, which attains a similar size and ranges throughout the same region as the last-named tree. It, also, is hard and tough, but not a durable wood. Varieties of pine, such as the sand-pine of Florida, the pitch-pine of the Rocky Mountains and the sugar-pine of California, have only a local use as lumber.

The distribution of standing pine throughout the United States has so wide a range, and the present existing supply covers so great an aggregate area, that it is next to impossible to fur-

nish an estimate of the quantity still available for use. It may be said, however, that notwithstanding the enormous annual lumber-cut—which, for all kinds of woods, both hard and soft, now averages about twenty-five thousand million feet—there is no danger of a scarcity of lumber for many years to come. There is, however, one question of economic importance in the lumbering industry which has relation especially to the Northwestern states, but may eventually prove quite wide in its influence. It is the question of the supply of white pine. This wood is now used for so many purposes to which it seems peculiarly adapted that it would seem as though the complete exhaustion of the supply must prove a loss which it will be difficult to repair. The uses to which it is now put by reason alone of its soft, light and cleanly character, are almost innumerable. The single question of packing-boxes need only be mentioned as an example. The white pine being not only light and strong, but free from pitch—all indispensable qualities—is used in preference to, and to an extent beyond, all others, and it is difficult to see how it will be possible to replace it when it no longer may be had.

In the Northwestern or Upper Lake states—chiefly confined to Michigan, Wisconsin and Minnesota—the cut of white pine in 1895 was 7,093,398,598 feet, besides which there were 2,465,368,600 shingles. This represents about the average of the past few years, and careful and conservative authorities estimate that the entire available supply of white pine will be exhausted within ten years. This must, necessarily, prove a great loss to the world, but, of course, with a vast supply of other timber to draw upon it cannot be an irreparable one.

PINE BLUFF, a city and the capital of Jefferson County, central southeastern Arkansas, 41 miles S.E. of Little Rock, on the Arkansas River, and on the Pine Bluff and Eastern, the St. Louis, Iron Mountain and Southern and the St. Louis and South-Western railroads. It has grist and planing mills, a cottonseed-oil mill, cotton-gins and the shops of the St. Louis, Arkansas and Texas railroad. Cotton is the leading staple, and extensive shipments are made of cotton and hides. It is an important manufacturing and educational center, and has an extensive trade in cotton and other products. Pop. 1890, 9,952; 1900, 11,496.

PINE-CHAFER, a popular name applied to any coleopterous insect which attacks the foliage of pine trees. Many of them do great damage. In the United States the name is given chiefly to *Anomala pinicola*. Species of several other genera have been sometimes called pine-chafers.

PINE-FINCH (*Spinus pinus*), a small North American bird allied to the American gold-finch (*S. tristis*), and a member of the family *Fringillidæ*. It is a migratory seed-eating bird. The name is also sometimes given to the pine-grosbeak (*Pinicola enucleator*). It is a much larger bird than the above and is found in both Europe and North America.

PINE-GROSBEAK. See GROSBEAK, Vol. XI, p. 186.

PINERO, ARTHUR WING, an English dramatist; born in London in 1855. Commencing a legal career, he afterward became an actor, making his *début* at Edinburgh in June, 1874, and afterward at the Lyceum and Haymarket theaters. Devoting himself to play-writing, he produced his first piece, which was entitled *Two Can Play at That Game*, at the Lyceum. This was followed by *£200 a Year* (1877); *The Money Spinner* (1880); *The Squire* (1881); *Lords and Commons; The Rocket* (1883); *The Magistrate* (1885); *Sweet Lavender; The Profligate; In Chancery; Lady Bountiful* (1891); *The Times* and *The Second Mrs. Tanqueray*, considered by many critics his best work (1893); *The Notorious Mrs. Ebbsmith* (1895); *The Benefit of the Doubt* (1895); *The Gay Lord Queux* (1899).

PINES, ISLE OF, an island of the Archipelago de Los Cannareos, 37 miles S. of the southern coast of Cuba, lying between the 21st and 22d parallels of north latitude and the 82d and 83d of west longitude. It has a length of 60 miles, a breadth of 55 miles and an area of 1,214 square miles. The coast of the island is indented by bays, and its surface diversified by mountains, plains and rivulets. The soil is fertile, the climate mild and healthful, and the presence of mineral springs, especially those of Santa Fé, has caused the island to be frequented as a health-resort. The principal products are cattle, tobacco, pine, mahogany, cedar and other woods, sulphur, tar, turpentine, tortoise shells, magnificent marble and rock crystal. It is a dependency of the province of Havana, and has its capital at Nueva Gerona. Pop., about 2,500.

PING-PONG. This new, exciting and exhilarating pastime is one that demands some skill in the player, to make it interesting to himself and lively for the onlookers. It is, in brief, a sort of table tennis, played by two persons standing at either end of an oblong, square-ended table, and striking with battledores or hand-rackets a ball across a framed net (some ten inches in height), affixed about the middle of the table. Increased interest is given to the game if two sets of players are engaged in it, each set at either end of the table playing with the same racket, one player taking up the racket, while the ball is in motion, as his partner throws it down. The rules of the game are usually supplied with the outfit.

PINKERTON, ALLAN G., detective; born in Glasgow, Scotland, Aug. 23, 1819. He learned the cooper's trade, became active in the Chartist movement, and in 1842 emigrated to Canada. After various experiences he opened a cooper's shop in Kane County, Ill., and there became active in aiding the escape of slaves. His first detective work was in the discovery and capture of a gang of counterfeiters on an island in Fox River. This gave him a reputation as a detective and for a number of years he was kept busy in running down counterfeiters, horse thieves, and railroad plunderers, this resulting after 1850

in the establishment of Pinkerton's Detective Agency, which in time became famous for its success. In 1861 he discovered a plot to assassinate President Lincoln on his journey to Washington, and arranged a plan to carry him safely through. When the war began Pinkerton was made chief of the bureau of secret service, in which position he did a vast amount of work during the war. Subsequently his agency was active in many important cases. He was stricken with paralysis about 1870, but continued to control his business till July 1, 1884, when he died in Chicago. G.J.H.

PINKERTON LAWS, or, more correctly, ANTI-PINKERTON LAWS, a class of statutes passed by the legislatures of many of the separate states after the very serious labor disturbances at Homestead, Pennsylvania (q.v., in these Supplements), in the hope of preventing similar disturbances in the future, and in response to the general and widespread sentiment of organized labor. The object of such laws is to prevent the importation of irresponsible and armed men to quell any domestic disturbances, and to prevent the swearing in or deputization of unknown and unreliable persons as peace-officers. It is claimed that the whole of the deplorable occurrences at Homestead were caused by the importation of the Pinkerton armed guards from Chicago and New York. These men were, it is alleged, commanded by leaders who had been discharged for serious offenses from the police force of the city of Chicago, and the bringing of such a body of men into the disturbed district at once precipitated trouble. There had been a long-standing and deep-seated grievance in this regard. The report on the coal combination, made in 1878 by the New York Assembly Committee on Railroads, had found "that the laboring population of the coal regions was 'kept down' by special policemen enrolled under special laws, and often in violation of law, by the railroads and coal and iron companies, practically when and in what numbers these companies choose; that these coal and iron policemen were practically without responsibility to any one but their employers, were armed as the corporations saw fit, with army revolvers or Winchester rifles, or both, were made detectives by statute, and were not required to wear shields: that they provoked the people to riot and then shot them legally." (Report, pp. 9, 94 et seq.)

As a natural outcome of the Homestead riots, many of the states placed highly penal statutes on their rolls, prohibiting, under severe and drastic penalties, the enrollment of any persons, other than citizens and residents in the county where the riots were, for the purpose of suppressing disturbances. Such statutes are in force in Colorado, Missouri, Georgia, Indiana, Illinois, Maine, Minnesota, North Carolina, Pennsylvania, Texas and Washington, and have been found to operate to the advantage of the community. There is no clause, however, restraining the United States marshal of any district from deputizing persons who are neither residents nor citizens for the purpose of executing the orders and decrees of the United States courts. In the railroad disturbances of 1894, when so many of the workingmen were in sympathy with the propaganda of Eugene V. Debs and his American Railroad Union, it was found necessary to bring "cowboys" from the West to Chicago, in order to guard the railroad yards from incendiary attacks, and some of the most valuable service was rendered by a force of non-resident marshals commanded by West Point cadets.

PINK-EYE OR INFLUENZA. See VETERINARY SCIENCE, Vol. XXIV, p. 219.

PINKNEY, WILLIAM, diplomatist; born in Annapolis, Md., March 17, 1764; was admitted to law practice in 1786, and in 1788 was a member of the Maryland convention to revise the Federal Constitution. He was a member of the Maryland House of Delegates in 1788–92, of the executive council of Maryland in 1792–95, and in 1796 was appointed by President Washington a commissioner to settle the claims for damage of American merchants arising under the Jay treaty with England. In 1804 he returned to the United States, in 1805 was appointed attorney-general of Maryland, and in 1806–11 was in London seeking to adjust the questions existing between Great Britain and the United States. He returned in 1811, was elected to the State Senate, and in December was appointed attorney-general of the United States; made minister to Russia in 1816; United States Senator in 1820, and died in Washington, Feb. 25, 1822. G.J.H.

PINKROOT, the popular name of *Spigelia Marilandica*, a plant of the family *Loganiaceæ*. It grows in rich woods of the Alleghany region and westward, with sessile lanceolate leaves, terminal spike-like clusters of handsome flowers (red outside, yellow within) and short pods. The root is used as a vermifuge,—a fact which gives rise to the common name worm-grass.

PIN-MONEY. See HUSBAND, Vol. XII, p. 417.

PINNIDÆ, a family of bivalve mollusks, found chiefly in warm seas. The triangular shells are sometimes twenty inches long. The byssus consists of long slender silken fibers, which were woven into a beautiful cloth by the ancients, and even now in some parts of Italy. The family has about fifty species, all of which are popularly known as the pinnas or the sea-wings.

PINNIPEDIA. See MAMMALIA, Vol. XV, p. 449.

PINTO. See PARASITISM, Vol. XVIII, p. 274.

PINTO, ALEXANDRE ALBERTO DA ROCHA SERPA, a Portuguese soldier; born April 20, 1846, at the Tendaes, in the province of Douro, and educated at the Royal Military College, Lisbon. In 1869 he was in the Zambesi war, and in the battle of November 23d, at Massangano, he succeeded in saving the regiment. He was then in command of the African native troop. During 1877–79 he crossed Africa from Benguella to Durban, and he has admirably described the journey in a work entitled *How I Crossed Africa* (1881).

These geographical tasks obtained for him the gold medals of the geographical societies of London, Paris, Antwerp, Rome and Marseilles. He was also elected a fellow of the most important geographical societies in the world and of many scientific associations. Major Serpa Pinto was made aide-de-camp to the King of Portugal in 1880. He was a knight commander of the Order of St. James of Portugal, a knight of the Legion of Honor and of Leopold of Belgium, and received many other orders. He died Dec. 28, 1900.

PIN-WORM. See VETERINARY SCIENCE, Vol. XXIV, p. 222.

PIOMBO, a Venetian painter. See SEBASTIANO, Vol. XXI, p. 646.

PIPE-CLAY OR TERRA ALBA, a very fine clay which is free from iron and other impurities. It has a grayish-white color, is greasy to the touch, has an earthy fracture, adheres easily to the tongue, and is plastic, tenacious and infusible. It is used in the manufacture of tobacco-pipes and white pottery. It is also a special article with soldiers, being excellently adapted for cleaning their white trousers, and particularly their belts.

PIPE-LINES. The first pipe-line of any importance laid in the United States for the transportation of petroleum was a four-inch pipe of 55 miles' length, leading from the oil-wells to Pittsburg. The total mileage of trunk lines in the United States in 1895 was 2,688 miles, divided as follows: Pittsburg line, 55 miles; Buffalo line, 4-inch pipe, 56 miles; Cleveland line, 5-inch, 111 miles; Philadelphia line, 6-inch, 235 miles; Baltimore line, 5-inch, 66 miles; New York line, 6-inch, 762 miles; tide-water line to Bayonne, New Jersey, 6-inch, 284 miles; Southern line, 6 and 8-inch, 364 miles; Crescent or Mellon line to Linwood, 5-inch, 267 miles; United States line to Wilkesbarre, 4 and 5 inch, 244 miles of double pipe, or 488 miles. The pipe-lines are used, as a rule, for transporting crude petroleum, but the United States line is built double because one pipe is used to transport the refined product kerosene.

In Russia there are 22 pipe-lines, some of them having 8-inch pipes. There are other short lines in Canada, Italy, Baku, Burma, Java and Sumatra.

In addition to these, there are a vast number of small diameter lines for private use, as for delivery from tank-steamers to storage-tanks in the large cities, and from individual wells to the trunk lines. No accurate census has ever been taken of these, but a representative of the Standard Oil Company estimates that there are at least twenty-five thousand miles of such two-inch lines in the Pennsylvania oil-field.

Trunk-line pipes are commonly made in 18-foot lengths, and connected by long sleeve-couplings with tapered threads. As a rule, the pipes are laid only two or three feet below the surface, and at short intervals bends are introduced to allow for expansion or contraction of the pipe with changes in temperature. The pipes are kept clean by passing through them a scraper familiarly known as a "go-devil." It consists of a set of radial steel blades, arranged to rotate around a center in such a manner that it tends to work itself forward. It is jointed so as to pass the bends, and is steadied by arms extending both forward and backward to keep it in proper position. At the end of the pipes, catch-boxes are placed to receive the go-devils on the completion of their trips.

In pumping the oil through the lines, a special form of pump is used which delivers the oil in a steady, continuous stream, without any hammering of the pipes. On the New York line are eleven pumping-stations, each having a boiler-house, pump-house containing two pumps, telegraph-office and two or more tanks. The pumps are capable of forwarding a barrel of oil at each stroke, every seven seconds, and are operated 24 hours a day.

The pipe-lines of the United States now carry nearly fifty million barrels of petroleum annually, and about ten millions more barrels are allowed to go to waste because of a lack of demand at ruling prices.

C. H. COCHRANE.

PIPE-MAKING. The larger sizes of gas-pipe and water-pipe are made usually of cast-iron with special machinery, the flasks or molding-boxes being also of iron. If a five-inch pipe is to be cast, a wooden pattern nearly six inches in diameter is set upright in the flask. The molding-sand having been jammed tight around this pattern, it is withdrawn, leaving a straight smooth hole the size of the outer diameter of the pipe that is to be made. Next a core five inches in diameter is slipped into the exact center of the hole in the mold, so as to leave a space all around to be filled with the molten iron. This core consists of a bar of iron which has been well wrapped about with rope, on which clay is pressed tightly and rounded up in a rough form of lathe, so that it is the exact size and shape of the interior of the desired pipe. The core thus formed is then baked hard, after which it is ready for use. A series of flasks, when ready, are taken by means of an overhead crane to the casting-pit. A huge ladle, capable of holding anywhere from half a ton to five tons of molten iron, is suspended on a track over the pit. When the iron in the cupola is at the proper heat, the ladle is run to the mouth, out of which flows the fiery hot metal. The ladle is then quickly swung over the various flasks, each of which is poured full. When cool, the flasks are taken out of the pit, and the pipes removed and cleaned, ready for market. Odd-shaped pieces, as crosses, Y's, T's and bends are cast in the same manner as any small hollow-work in an iron foundry.

Where large iron pipe of one to three feet diameter is to be made quite thin, the latest process of manufacture is to form it from sheet-metal by electric welding. Before electric welding came in, it was impracticable to make a wrought-iron or steel pipe of two-foot diameter, or less than three eighths of an inch thickness, because so much of it had to be heated at once that it would not main-

tain its shape. The electric welder requires the heating of only a small portion at a time, hence it is entirely practicable to make a two-foot pipe of only one quarter of an inch thickness, or even less.

The most recent machinery for making lead pipe consists principally of a powerful hydraulic press, into the heated cylinder of which molten lead is poured from a furnace. Proper dies being fastened in the ram above, the cylinder is forced upward, pressing the lead up through the holes in the dies. The lead is chilled and solidified as it passes upward into the form of completed pipe, which is then coiled on a drum in lengths of about ten feet, and is ready for market.

C. H. Cochrane.

PIPERACEÆ. See Pepper, Vol. XVIII, p. 527.

PIPESTONE, a village and the capital of Pipestone County, southwestern Minnesota, 88 miles S. of Ortonville, on the Burlington, Cedar Rapids and Northern, the Chicago, Milwaukee and St. Paul, the Chicago, St. Paul, Minneapolis and Omaha and the Great Northern railroads; has the pipestone-quarry and some manufactories. Population 1890, 1,232; 1900, 2,536.

PIPE-TOOLS. The most important machine of the pipe-fitter is the cutting and threading machine, commonly called a pipe-machine. They are fitted with sets of die-stocks, and are made for both hand and power. Hand-cutters are made somewhat in the form of a wrench, but with rotating cutter-wheels in place of gripping faces. Chain pipe-tongs have come into considerable use, having a metal chain, which is cramped about the pipe, there being one toothed face on the tool to prevent slipping. The forms of pipe-vise are too numerous to catalogue here. The most common of them have two V-toothed faces, which are screwed together, thus pressing the pipe at four points. Pipe-tapping machines are made with a chain grip to hold them solid to the pipe. The drilling and tapping are then done with a ratchet-handle set in the framework of the machine. A recent successful form of pipe-jointer has a metal band which is packed and passed around the joint which it is desired to make tight. A thumbscrew arrangement is then tightened up, drawing the band and packing snugly into place. A pipe-bender is commonly made of a coiled spring, inserted within the pipe, which may then be bent in any convenient manner without being deformed by doubling at the bend. Pipe-dies are made like any other thread-cutting dies, except that they are almost invariably made for cutting taper threads. Pipe-wrenches are commonly made like monkey-wrenches, except that one jaw is toothed and curved. Other minor tools are manufactured in great variety for the use of the pipe-fitter.

PIQUA, a city of Miami County, western Ohio, 27 miles N. of Dayton, in a rich agricultural district, on the Miami River, on the Miami and Erie canal, and on the Pittsburg, Cincinnati and St. Louis and the Cincinnati and Michigan railways. It has abundant water-power, and manufactures of corrugated iron, flour, oatmeal, carriages, furniture, stoves and ranges; has the Schmidlapp Free School, a public library, three national banks and three daily papers. Population 1890, 9,090; 1900, 12,172.

PIRACICABA or CONSTITUICÁO, Brazil, a city of the state of São Paulo on the Tiete tributary of the Rio Paraná, 90 miles by rail northwest of São Paulo. It exports coffee and sugar. Population, 5,000. C.L.S.

PIRÆUS. See Athens, Vol. III, p. 5.

PISA, Council of. See Popedom, Vol. XIX, p. 516.

PISAGUA, a town in the province of Tarapacá, Chile, 44 miles N. of Iquique, a large port of shipment for great quantities of nitrate of soda. The town was destroyed on Aug. 13, 1868, by a great wave following an earthquake, was rebuilt only to be destroyed a second time during the Chilean-Peruvian war; has since been totally rebuilt. Population, about 5,000.

PISAN, Christine de. See France, Vol. IX, pp. 569, 571.

PISANO. See Giunta, Vol. X, p. 557.

PISCATAQUA, a river about eighty miles in length, formed by the junction of the Salmon Falls and Cocheco rivers, and forms the southern part of the boundary between Maine and New Hampshire; empties itself into the Atlantic, forming at its mouth the excellent harbor of Portsmouth.

PISCATAQUIS, a river which rises in Somerset County, northwestern Maine, and flowing east through Piscataquis County, reaches the Penobscot River at a point called Howland. Length of the river, nearly seventy-five miles.

PISCIDIA, a West Indian genus of leguminous trees, whose single species (*P. Erythrina*) yields a valuable and beautiful wood. The powdered leaves and twigs are used to stupefy fish. The species occurs to some extent, also, in Florida and Mexico.

PISTIL. See Botany, Vol. IV, p. 128.

PITCH. See Music, Vol. XVII, p. 109.

PITCHER PLANTS. See Insectivorous Plants, Vol. XIII, pp. 145–146.

PITCHSTONE. See Geology, Vol. X, p. 206.

PITH. See Botany, Vol. IV, p. 89.

PITHECANTHROPUS ERECTUS, the name given to the once-existing animal represented by certain fossil remains recently discovered in Java by Dr. Dubois, and regarded as the "missing link" between man and ape. The discovery of the remains, made in 1891 and 1892, created a widespread interest, and was discussed in the meetings of scientific bodies all over the world. The remains were described by the discoverer in a publication with the following title: *Pithecanthropus Erectus, Eine Menschenähnliche Uebergangsform aus Java. Von Eug. Dubois, Militärarzt der Niederländisch-Indischen Armee. Mit Zwei Tafeln und Drei in den Text Gedruckten Figuren. 4to Batavia: 1894.*

A summary of the description was published by Prof. O. C. Marsh in the *American Journal of Science*, February, 1895. As it is seldom that a

"new man" is discovered, we quote Professor Marsh's article somewhat extensively, the discovery being the most important that has been made in the department of anthropology since the "man of Spy" came, in 1886, to the rescue of the Neanderthal discovered in 1857.

The three specimens were found near Trinil, in the precinct of Ngwai, of the Madiun province, central Java, at different times, in the same horizon, and all imbedded in the same volcanic tufa. The tooth was found in September, 1891, the skull a month later, only a meter distant from the tooth; and in August, 1892, the femur was found, 15 meters from the positions of the former. The characters of these fossils were regarded by their discoverer as entitling them to represent a new species and genus, and also a new family (*Pithecanthropidæ*), distinguished by the following characters:

The brain cavity is larger, and in proportion to the size of the body much more capacious, than in *Simiidæ*, yet less so than in *Hominidæ*. The capacity of the skull is about two thirds less than that of the average of man. The inclination of the nuchal surface of the occiput is considerably greater than in *Simiidæ* The dentition, although somewhat specialized, is still of the Simian type. The femur is equal in its dimensions to that of man, and, like that, adapted for walking in an upright position.

Only the upper portion of the skull is preserved—the line of fracture extending from the glabella backward irregularly to the occiput, which it divides somewhat below the upper nuchal line. The cranium, as seen from above, is an elongated oval in outline, dolicephalic. It is distinguished from that of other anthropoid apes by its large size and its higher arching in the coronal region. The greatest length from the glabella to the posterior projection of the occiput is 185 millimeters; the greatest breadth is 130 millimeters, and smallest (behind the orbit) 90 millimeters. The cranium, in its original condition, must have been of slightly greater dimensions. The upper surface is smooth, and the sutures all appear to be obliterated.

This dolicephalic skull, with an index of 70°, is readidly distinguished from that of orang-utan, which is decidedly brachycephalic. The absence of the characteristic cranial crests will separate it from the skull of the adult gorilla. In its smooth upper surface and general form, it shows a resemblance to the skull of the chimpanzee, and still closer to that of the gibbons.

The tooth is the last upper molar of the right side, and is in good preservation. It indicates a fully adult, but not a very old, animal. The crown is subtriangular in form with rounded corners, the narrowest portion being behind. The anteroposterior diameter of the crown is 11.3 millimeters, and the transverse diameter 15.3 millimeters. The grinding-surface of the crown is concave, and much less rugose than in existing anthropoid apes.

The femur, which is from the left side, is in fair preservation. In form and dimensions it resembles so strongly a human femur that only a careful comparison would distinguish the one from the other. The bone is very long, its greatest length being 455 millimeters. The shaft is slender and nearly straight.

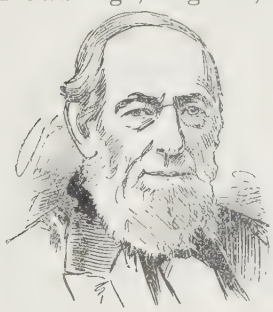
Professor Marsh, in concluding his remarks says: "Dr. Dubois has proved the existence of a new prehistoric anthropoid form, not human indeed, but in size, brain-power and erect posture much nearer man than any animal hitherto discovered, living or extinct."

The significance of these remains will appeal more forcibly to the popular mind when it is pointed out that during the epoch when *Pithecanthropus* was wandering about in his native habitat, and in his supposedly erect manner, Java was continuous with Asia and Europe, the whole then existing as a continent, sweeping round to Tunis, in Africa, and divided by the Saharan Sea from southern Africa. Arabia and Hindustan were islands; but there were land bridges between the continent we have described, to which modern scientists have given the name Eurasia,and South Africa. Further, there was a land connection, by England, Iceland and Greenland, with America. We have thus a valuable aid to our understanding of the possibility of the "new man" having been in the line of evolution or descent with later man himself. If these conclusions are correct the antiquity of man must be extended back into the Tertiary, and his affinities with the higher apes become much closer than hitherto supposed.

PITMAN, Benn, phonographer; born in Trowbridge, England, July 24, 1822; brother of Sir Isaac Pitman. He came to the United States in 1853; and founded the Phonographic Institute in Cincinnati. In 1856 he invented the electro-process of relief engraving. During the Civil War he was military recorder of state trials, and in 1873–92 was lecturer and teacher of art at the Cincinnati Art Academy. He is the author of *The Reporter's Companion; History of Shorthand; A Plea for American Decorative Art; Life of Sir Isaac Pitman*, etc. G.J.H.

PITMAN, Emma (Raymond), an English authoress; born in Milborne Port, Somersetshire, in 1841; while young, gained several prizes for essays, and was a contributor to *Sunday at Home* and other periodicals. When 17 years of age she finished her first work, *The Power of Little Things*. Her works began to appear regularly from 1869, in which year appeared *Vestina's Martyrdom*, followed by *Earnest Christianity* (1872); *Margaret Mervyn's Cross* (1878); *Profit and Loss* (1879); *Heroines of the Mission Field* (1880); *Mission Life in Greece and Palestine* (1881); *Florence Godfrey's Faith; Life's Daily Ministry; My Governess Life* (1882); *Central Africa, Japan and Fiji* (1883); *Elizabeth Fry* (1884); *George Muller and Andrew Reed* (1885); *One of the Least* and *Ray Elliott's Deliverer* (1887); *Lady Missionaries in Foreign Lands* (1889); *Lady Hymn Writers* (1891); *Oliver Chauncey's Trust* (1892). In 1866 she married Edwin Pitman.

PITMAN, Sir Isaac, stenographer; born in Trowbridge, England, March 6, 1813. At twelve years of age he entered the counting-house of a clothing manufacturer, where he remained as clerk for six years. Later he attended the normal college of the British and Foreign School Society; in 1831 was appointed master of the school at Barton-upon-Humber; and in 1836 established the British school at Wotten-under-Edge. Up to this time he was developing a system of shorthand writing, and in 1837 published his *Stenographic Soundhand*, which he distributed among the schoolmasters of England. His system of shorthand was revised in 1840 and entitled *Phonography, or Writing by Sound*, and his *Phonographic Reporter's Companion* appeared in 1846. The previous year Mr. Pitman had established his printing works at Bath, where he frequently did all the work himself, setting up his phonographic type and correcting proofs. By 1849 phonography had taken nearly the shape it now wears, but Mr. Pitman published a good many editions of his books after that year. In May, 1894, he was knighted by Queen Victoria. He died in Bath, January 22, 1897. G.J.H.



SIR ISAAC PITMAN.

PITRA, Jean Baptiste, a Roman Catholic ecclesiastic, born in Champforgeuil, near Autun, Aug. 31, 1812; entered the order of St. Benedict and devoted himself to historical studies in the abbey of Solesme. In 1858 he was sent by the pope to Russia to study the Slavonic liturgy, was created a cardinal priest in March, 1863, librarian of the Vatican in 1869, and cardinal bishop of Frascati in 1879. His works include *Spicilegium Solesmense* (1852–60); and *Juris Ecclesiastici Græcorum Historia et Monumenta* (1864–68). He died Feb. 3, 1889.

PITRÉ, Giuseppe, an Italian folk-lorist; born in Palermo, Dec. 23, 1841. On the outbreak of the revolution in 1860 he volunteered into the army of Garibaldi. At the close of the war he studied medicine at Palermo, graduating in 1866. About 1868 he began the great work of his life, when he left the study of literature proper for that of popular literature and folk-lore generally. With incessant and enthusiastic labor he devoted himself to his chosen study, and enriched science and honored his native land with a long series of books and papers of the highest value, covering the whole field of Italian folk-lore. His *Biblioteca Tradizioni Populari Siciliane* includes 19 volumes (1870–91); while another series, *Curiosità Popolari Siciliane*, includes 10 volumes (1885–91). A large amount of his most valuable work is to be found in the pages of the quarterly journal founded and edited by him in 1882, *Archivo per lo Studio delle Tradizioni Popolari*. He also published *Bibliografia delle Tradizioni Popolari d'Italia* (1891).

PITTIDÆ. See Pitta, Vol. XIX, p. 159.

PITTOSPORUM FAMILY, a small family of shrubs and trees, belonging mostly to Australia. The common *Pittosporum* (*P. Tobira*) of cultivation is a low tree from Japan, with obovate evergreen leaves crowded at the ends of the branches, which are terminated by a small sessile cluster of fragrant white flowers.

PITT PRESS, Cambridge, England, an educational publishing enterprise under the auspices of the University of Cambridge, and a department of the Cambridge University Press. It is housed in an ecclesiastical-looking building, and perpetuates the memory of William Pitt, the Premier. Its publications are chiefly text-books for schools and colleges, annotated by well-known scholars, including the classics, English and modern languages, literature, and other subjects read for the Cambridge local examinations and for use in secondary schools and first-year work in colleges.

PITTSBURG, a city of Crawford County, southeastern Kansas, 55 miles E. of Independence, on the Atchison, Topeka and Santa Fé, the Kansas City, Pittsburg and Gulf, the Missouri Pacific and the St. Louis and San Francisco railroads. It is in a coal-mining district and contains zinc-works and coal-mines with very large deposits. There are large brick-works and other manufactures. Population 1890, 6,697; 1900, 10,112.

PITTSBURG, a city of Pennsylvania. The table on the following page will show some of the principal mechanical and manufacturing industries of Pittsburg as given by the United States census of 1890. The numerous lofty hills, which in its early days closely environed the town, have, with the growth of the city and consequent enlargement of its borders, been cut down, or much reduced, and now the highest eminence is Herron Hill, having an elevation of 535 feet above the plateau portion of the city. In 1894 there were 405 miles of streets, mostly paved and sewered, lighted with gas and electricity, and traversed by cable and electric street railways, which connected the city with Allegheny and other suburbs.

Among some of Pittsburg's new buildings are the City Hall, on Smithfield Street, built entirely of solid white sandstone, at a cost of $700,000; the United States Post-Office and Court-house, built in 1884; Trinity and St. Peter's, First and Third Presbyterian and German Lutheran churches. The city has six colleges and seminaries; the Western Pennsylvania University, which was completed in 1890, has a library of 10,000 volumes. The school census of 1900 shows that 37,564 pupils are enrolled, and 705 teachers. The Mercantile Library Association, with a membership of 850, reports, in 1901, 33,386 volumes on its shelves. Among the benevolent institutions are such hospitals as the Mercy; the West Pennsylvania, with a department for insane at

Mechanical and Manufacturing Industries. (Census of 1900.)	Number of Establishments Reporting.	Aggregate Capital Invested.	Average Number of Employees.	Average Total Wages.	Total Value of Products.
Electrical apparatus and supplies	8	$ 16,070,738	6,369	$ 3,865,221	$ 14,013,450
Fire-clay, pottery, and terra cotta products	8	2,774,471	2,138	645,999	1,396,292
Glass	16	3,588,202	2,211	1,269,956	2,429,686
Iron and steel	36	75,149,146	25,333	15,070,728	90,798,086
Iron work, architectural and ornamental	9	4,412,379	2,201	1,216,305	6,111,943
Liquors, malt	7	13,419,671	453	471,963	3,586,393
Tin and terne plate	4	374,336	234	135,777	1,837,926
Tobacco, cigars and cigarettes	147	714,730	1,426	505,820	1,757,499
Printing and publishing	112	4,949,807	2,649	1,867,332	4,644,101
Men's clothing	154	1,682,575	1,585	722,555	2,742,770
Paints	6	1,024,114	227	135,702	1,402,038
Petroleum, refining	4	1,183,609	170	123,459	1,315,040
Slaughtering and meat packing	5	786,810	197	136,663	2,054,521
Foundry and machine-shop products	83	14,897,525	6,807	4,173,954	15,545,561

Dixmont; the City General; the Homœopathic Dispensary; the Pittsburg Dispensary; the Pittsburg Infirmary; several homes under various church auspices; and the Roman Catholic Orphan Asylum. The above table enumerates the chief industries of Pittsburg in 1900. A very handsome railroad bridge was constructed in 1890 over the Ohio river, connecting Brunot's Island with the city. Pop. 1890, 238,617; 1900, 321,616. See also Pittsburg, Vol. XIX, p. 160.

PITTSBURG, a village and the capital of Camp County, northeastern Texas, 110 miles E. of Dallas, on the Sherman, Shreveport and Southern and the St. Louis South-Western railroads. It has planing and grist mills; has coal in vicinity, and produces sugar-cane, cotton and lumber. Population 1890, 1,203; 1900, 1,783.

PITTSBURG LANDING, Battle of, called by the Confederates "the battle of Shiloh." This was the most important engagement of the western armies during the Civil War. The Federal forces were under the command of Gen. U. S. Grant and the Confederates under the command of General Albert Sidney Johnston. The date was April 6 and 7, 1862. The field embraced a district about three miles in width, extending from Pittsburg Landing, on the Tennessee River, to a log meeting-house called Shiloh. Pittsburg Landing is ten miles from the northern boundary of Mississippi and 17 miles northwest of Corinth, Mississippi. Shiloh Church stood on the Corinth road, on a ridge of land extending from the Snake River to Lick Creek. Snake River empties into the Tennessee below Pittsburg Landing, and Lick Creek about a mile and a half above. Both streams were bordered with swamps. The whole country is undulating and scatteringly wooded. Grant had determined to attack the Confederates, who were concentrated at Corinth. He had under his immediate command the divisions of Sherman, Prentiss, McClernand, Hurlburt, W. H. L. Wallace and Stuart. The troops of these divisions he had marched from Savannah, nine miles to the north. They were drawn up with Sherman on the right near Snake River, McClernand in the center and Prentiss on the left, with Stuart, Hurlburt and Wallace close upon the rear as reserves. At Pittsburg Landing lay two gunboats to cover the crossing. Five miles down the river was General Lew Wallace with a division. Nearing Savannah was General Buell with the divisions under McCook, Nelson and Crittenden. The troops under Buell and Lew Wallace were veterans. Those under Grant were, for the most part, raw recruits. The total number of effective Union men who participated in the battle was about fifty-eight thousand.

Johnston had about forty thousand men, under Generals Hardee, Bragg, Polk, Beauregard and Breckinridge. Anticipating Grant's motive, Johnston, knowing the raw condition of the greater portion of the Federal troops, and fearing a junction between Grant and Buell, decided to attack Grant near Pittsburg Landing. He advanced from Corinth on the 3d and 4th, and on the afternoon of the 5th was two miles from Shiloh. He ordered a general attack by Hardee, Bragg and Polk on the morning of the 6th. The Federal forces, though taken somewhat by surprise, almost immediately recovered, and made a most obstinate resistance. They were gradually forced back, until at half-past ten they were a mile from their original position. Here a stand was made and the position held until four p.m., when a terrible charge of the Confederate reserves under Breckinridge drove the Federal troops on the left back almost to the river. The first day's fighting ended with the retreat. Prentiss with 2,200 of his men were taken prisoners and Gen. W. H. L. Wallace was killed. That night the Federals were reinforced by Generals Buell and Lew Wallace and at daybreak, next morning, Grant ordered an attack. The Confederates made a stubborn resistance, but were forced back, and by a bayonet charge, led by Grant himself, driven in full retreat toward Corinth. This Union victory led to the continued retreat of the Confederates from Corinth and ultimately to the surrender of Vicksburg. The Federal losses missing and wounded, were 11,293, and 1,754 killed. The Confederates, missing and wounded, 8,969, and 1,728 killed.

PITTSFIELD, a village and the capital of Pike County, western Illinois, 62 miles W. of Springfield and 40 miles S. E. of Quincy, on the Wabash rail-

road; the trade center of an agricultural district, and has a woolen factory, a graded school, and nine churches. Pop. 1890, 2,295; 1900, 3,588.

PITTSFIELD, a village of Somerset County, south-central Maine, 37 miles N.N.E. of Augusta and 25 miles W. of Bangor, on the Maine Central and the Sebasticook and Moosehead railroads. It has a woolen-mill, iron foundry and the Central Maine Institute. Pop. 1890, 1,597; 1900, 1,760.

PITTSFIELD, a city and the capital of Berkshire County, Massachusetts. The principal industries are the manufacture of shirts, bricks, paper, paper machinery, electric machinery, shuttles and bobbins and brass castings, and it has a brewery. Pittsfield has the hospital of the House of Mercy, Old Woman's Home, Training School for Nurses, three national and two savings banks. There are 24 public school buildings and 11 churches. Pop. 1890, 17,281; 1900, 21,766. See also PITTSFIELD, Vol. XIX.

PITTSFIELD, a village of Merrimack County, central Southeastern New Hampshire, 25 miles N.E. of Concord, on the Boston and Maine railroad. It has an academy and manufactures of cotton goods, boots and shoes. Pop. 1890, 2,605; 1900, 2,129.

PITTSTON, a borough of Pennsylvania, on the Delaware, Lackawanna and Western and the Lehigh Valley railroads. Population 1890, 10,302; 1900, 12,556. See also PITTSTON, Vol. XIX, p. 162.

PIURA, a town of Peru, 210 miles S. by W. of Guayaquil, Ecuador; the capital of the department of Piura. The department contains a rich petroleum deposit, about 4,000 square miles in extent, mostly lying close to the coast, near the Bay of Tumbez. Population of town, 8,000.

PIUS X., POPE, (Giuseppo Sarto), was born June 2, 1835, at Riese, in the province of Venice, and was educated in the Salesian Institute at Cottolengo, founded by the famous Dom Bosco He was a parish priest in the province of Venice for the most of his years and finally became bishop. His high executive qualities and unexcelled learning became known soon after his elevation and were recognized by the authorities of the church. He was created Cardinal by Leo XIII., at the Consistory of June 12, 1893, at which time he was also named as Patriarch of Venice. Cardinal Sarto enjoyed great popularity in his diocese and was highly honored by all for the strict uprightness of his life and his liberal ideas. He was elected Pope by the conclave of Cardinals at Rome, August 4, 1903, successor of Pope Leo XIII., and at once entered upon the duties of his sacred office.

PIUTES OR PAH-UTES, a tribe of the Shoshonean linguistic stock of North American Indians, the name properly belonging to the Corn Creek tribe of southwestern Utah. In a wider acceptation, the name includes numerous Shoshonean tribes—8 in southwestern Utah, 17 in southeastern Nevada, 4 in northern and western Arizona (those including the Chemehuevi, the southernmost members of the tribe) and 19 in southeastern California, extending from Owens Valley, along the Sierras, to the south of Tulare Lake and east of the Coast Range. The tribe numbers altogether about six thousand. They are industrious and always looking for employment. They readily perform manual labors and are expert vaqueros.

PIZARRO, GONZALO. See PERU, Vol. XVIII, p. 690.

PLACENTA. See MAMMALIA, Vol. XV, p. 371. Vegetable; see BOTANY, Vol. IV, p. 129.

PLACER-MINING. See GOLD AND GOLD-MINING, in these Supplements.

PLACERVILLE, a town and the capital of Eldorado County, northeastern central California, about 50 miles N.E. of Sacramento, on the south fork of the American River, and on the Southern Pacific railroad. It is in a mountainous region, and is engaged principally in gold-mining, but has also sash and door factories, foundry, machine-shop and quarries of slate and limestone. Population 1890, 1,690. 1900, 1,748.

PLAINFIELD, a village of Windham County, eastern Connecticut, 27 miles W. of Providence and 23 miles N.N.E. of New London, on the New England railroad; in an agricultural district, and has factories of cotton and woolen goods, bricks and carriages. Population 1890, 4,582. 1900, 4,821.

PLAINFIELD, an important resident city of Union County, New Jersey, in the central part of the state. It is eminently salubrious and has a pleasant climate, and is distinctively a residential city, tributary to New York, but is also developing some important industries, including machine shops. It is on the Central railroad of New Jersey, and had in 1900 a population of 15,369. See Vol. XIX, p. 179. W.F.J.

PLAINS, a village of Luzerne County, eastern Pennsylvania, about five miles N.E. of Wilkesbarre, on the Susquehanna River, and on the Central Railroad of New Jersey and the Lehigh Valley railroad. It is in a mining district, and its chief industry is the mining of coal. Pop. township 1900, 6,872.

PLAINS, THE GREAT. See UNITED STATES, Vol. XXIII, pp.860, 864.

PLAINWELL, a village of Allegan County, southwestern Michigan, on the Kalamazoo River, and on the Lake Shore and Michigan Southern and the Grand Rapids and Indiana railroads, 10 miles N. of Kalamazoo. It is situated in an agricultural and fruit-raising district, and contains a number of flour, lumber and paper manufactories. Population 1890, 1,414; 1900, 1,318.

PLANER TREE, the common name of *Planera aquatica*, a small tree of the river swamps from Kentucky southward, with ovate-oblong leaves, axillary cluster of small flowers and a nut-like fruit beset with irregular warts or crests. It belongs to the family *Urticaceæ*, and is very closely related to the elms.

PLANE TREE. See ARBORICULTURE, Vol. II, p. 278.

PLANE-TABLE. See SURVEYING, Vol. XXII, p. 755.

PLANETS. See ASTRONOMY, Vol. II, pp. 679–685; and in these Supplements.

PLANIGRAPH, a draftsman's instrument for copying a drawing on a different scale. It is a rod having a variety of scales marked on the opposite ends. Being pivoted in the center, and one end

being allowed to rest on the drawing, measurements may be read from a scale on that end and marked off on a paper under the other end by a different scale, which will enlarge or reduce the proportions as desired.

PLANKTON, a term, meaning wandering, originally applied by Hensen to all organisms, collectively, which float involuntarily near the surface of the ocean and other waters. Haeckel, in his *Plankton Studien* (1890), included under the term all organisms swimming either actively or floating passively in the water, while those living on the bottom or shore were called collectively *benthos*. Recently the term has become limited in application, and in general use it is a collective term for the small organisms of the *plankton* in above sense, especially those which are eaten by fishes. The United States Fish Commission has undertaken extensive studies of the nature, i.e., the kinds of organisms composing the *plankton*, its amount and distribution and especially its value as food of fishes. By studying collections from various localities and depths, and by determining the organisms eaten by various fishes, it has been definitely shown that there is a close co-relation between the nature, the amount and distribution of the *plankton*, and the forms, numbers and distribution of fishes. Thus the *plankton* studies have come to have a great economic importance.

PLAN OF CAMPAIGN, The. See Home Rule, in these Supplements.

PLANOGAMETE, the name applied to those gametes (sexual cells) of isogamous plants (that is, those in which the gametes are alike) which are not free-swimming. Examples are found among the conjugate algæ.

PLANQUETTE, Robert, a French composer; born in Paris, July 31, 1850; educated at the Conservatoire. Having achieved success in his songs and chansonettes for the cafés-concerts, he attempted operettas, producing *Valet de Cour; Le Serment de Mme. Grégoire;* and *Paille d'Avoine.* Then he produced *Les Cloches de Corneville,* an operetta in three acts, which was produced at the Folies Dramatiques, April 19, 1878, and had an immediate success. It was reproduced as *The Chimes of Normandy*, in an English adaptation, in London, the following year. Among his other works are *Le Chevalier Gaston* (1879); *Les Voltigeurs de la 32me* (1880); *Rip Van Winkle* (1882); *Paul Jones* (1889); and *Le Talisman* (1893). Author of a volume of military songs, *Refrains du Régiment.* Died Jan. 28, 1903.

PLANT-CUTTER, a name given to birds of the family *Phytootmidæ,* which is composed of the single genus *Phytotoma.* They are small sparrow-like birds, having serrated bills, with which they cut off young sprouts and buds of plants. In western South America they often greatly injure plantations. Their peculiar, harsh, rasping cry is very disagreeable.

PLANTÉ'S CELL. See Electricity, § 109, in these Supplements.

PLANT-LOUSE. See Insects, Vol. XIII, p. 160.

PLANT PHYSIOLOGY. See Ecology, in these Supplements.

PLANTS. See Botany, Vol. IV, p. 70; and Vegetable Kingdom, Vol. XXIV, pp. 136–143.

PLANTS, Fossil. See Distribution, Vol. VII, pp. 248–252.

PLANULA STAGE. See Hydrozoa, Vol. XII, p. 590.

PLAQUEMINE, a town and the parish seat of Iberville Parish, Louisiana, in the south-central part of the state. It is on the Mississippi River, 67 miles west by north from New Orleans, and is reached by the Texas and Pacific railroad. It is in a sugar and corn growing region, and has much trade in those products. Its population in 1900 was 3,590. W.F.J.

PLASSY, Battle of. See Clive, Vol. VI, p. 11.

PLASTER OF PARIS. See Gypsum, Vol. XI, p. 313.

PLASTIDS, in botany, are certain organized cell-contents which are widely variable in form. When colorless they are called *leucoplastids;* if colored, they are known as *chromatophores.* The best-known plastid is the one colored with the green coloring-matter *chlorophyll,* and known as a *chloroplastid.* When chromatophores contain no chlorophyll they are known as chromoplastids, yellow being the most common coloring-matter.

PLATE-GLASS INSURANCE COMPANIES. See Accident and Casualty Insurance, in these Supplements.

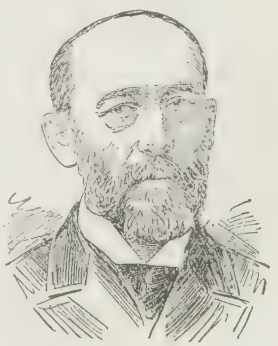
PLATINIRIDIUM. See Mineralogy, Vol. XVI, p. 398.

PLATINOTYPE PROCESSES. See Photography, in these Supplements.

PLATONISTIDÆ. See Mammalia, Vol. XV, p. 401.

PLATT, Orville Hitchcock, legislator; born in Washington, Conn., June 19, 1827. He worked as a boy on his father's farm; afterward studied law; was admitted to the bar, and practiced in Connecticut and Pennsylvania. In 1857 he was elected secretary of state of Connecticut; was for some years a member of the state legislature; was a judge of probate in 1877, and in 1879 was elected to the United States Senate, of which he is still a member, being regarded as a forceful speaker and a legislator of judgment and ability. G.J.H.

PLATT, Thomas Collier, an American politician; born in Owego, N. Y., July 15, 1833. He failed to graduate at Yale with the class of 1853, on account of ill health. His first business experience was in Owego, where later he became president of the Tioga National Bank. He engaged in lumbering in Michigan; was clerk of Tioga County, 1859–61; and Representative in Congress from New York, 1873–77. He became United States senator, Jan. 18, 1881; but, owing to pique over Pres. Garfield's course concerning nominations to New York offices, resigned (with Senator Conk-



THOMAS C. PLATT.

ling) on May 16 following. He has been president of the United States Express Co. since 1880, and has held a like position in the Southern Central and Addison & Northern Pennsylvania Railroad companies. He has for many years been recognized as a leader in Republican politics, and in 1897 was re-elected to the United States Senate, succeeding himself in 1903.

E.E.T

PLATT-DEUTSCH. See GERMANY, Vol. X, p. 462.

PLATTE RIVER. See NEBRASKA, Vol. XVII, p. 316.

PLATTSBURG, a village and the county seat of Clinton County, New York, in the northeastern corner of the state. It is on Lake Champlain, at the mouth of the Saranac River, and is in favor as a place of residence and summer resort. It is the seat of the Roman Catholic Summer School of America. Its population in 1900 was 8,434. See also Vol. XIX, p. 225. W.F.J.

PLATTSMOUTH, a city and the county seat of Cass County, Nebraska, on the eastern border of the state. It lies on the west bank of the Missouri River, at the entrance of the Platte River into that stream, about eighteen miles south of Omaha, and is reached by the Missouri Pacific railroad and the Burlington and Missouri River railroad in Nebraska. It is an important center of the grain, cattle and lumber trades, and contains some industrial establishments, including railroad repair shops, brick and tile kilns, factories of vehicles, flour mills, etc., and is well equipped with urban institutions. Its population in 1900 was 4,964. W.F.J.

PLATTVILLE, a village of Grant Co., southwestern Wisconsin, 23 miles N. of Galena and 62 miles W.N.W. of Madison, on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads. Its manufactures include a powder-mill, flour-mills, carriage, plow and wagon factories and a foundry and machine-shop; is in a lead-mining district, and ships live-stock, grain, lead and powder. Has a state normal school. Pop., 1890, 2,740; 1900, 3,340.

PLATYHELMINTHES. See TAPE-WORM, Vol. XXIII, p. 54.

PLATYPTERA, a suborder of the pseudoneuropterous insects, including the white ants (*Termitidæ*), the stone-flies (*Perlidæ*), the deathticks (*Psocidæ*), and others. The term is practically equivalent to the *Isoptera* of some authors.

PLATYRRHINA, a group of monkeys characterized by having a broad, flat nasal septum and the nostrils far apart. The American members of the *Primates* constitute the group. It is opposed to *Catarrhina* (q. v., in these Supplements).

PLAYFAIR, LYON, first BARON PLAYFAIR OF ST. ANDREWS; was born a commoner at Chunar, Bengal, on May 21, 1818, his parents being Scotch. He was sent home to be educated at St. Andrews, and afterward studied medicine at Glasgow, and at Edinburgh. His health failed, and he abandoned his medical studies, but in 1839–40 studied chemistry at University College, London, and under Liebig, at Giessen, graduating at Giessen with the degree of Ph.D. He engaged in industrial chemistry, was honorary professor at the Royal Institution, Manchester, and then became one of the chief promoters of agricultural and industrial chemistry in Great Britain. In 1845 he was chemist to the Geological Survey and professor in the School of Mines, and conducted valuable investigations into the use of coal and the origin of potato rot in Ireland. He was associated with Joule and Bunsen in some of their most important work, was elected a fellow of the Royal Society in 1848, and was president of the British Association in 1885. He was one of the foremost organizers of the London world's fair of 1851, for which services he was knighted; made investigations of the state of educational and technical instruction in Europe; became a secretary of the Department of Science and Art in 1853; helped to organize the Royal College of Science and Art and the South Kensington Museum, and from 1858 to 1869 was professor of chemistry in the University of Edinburgh. He served on many royal commissions, dealing with such subjects as the health of towns, the herring fishery, the cattle plague, the civil service (of which he was a notable reorganizer), the Scottish universities, endowed schools, and the Thirlmere water scheme. He entered Parliament in 1868 as a Liberal, representing Edinburgh and St. Andrews universities, and was successively re-elected until 1885, and thereafter sat for South Leeds until 1892. He was postmaster-general in 1873, deputy speaker of the House in 1880–83, in which place he created a sensation by suspending sixteen disorderly Irish members; and vice-president of the Council in 1886. In 1892 he was raised to the peerage as Baron Playfair of St. Andrews, and thereafter served on the commission on the aged poor, and in the Venezuela boundary arbitration. He was three times married, his third wife being Edith Russell, of Boston, Massachusetts. He died on May 29, 1898.

LYON PLAYFAIR.

W.F.J.

PLEA. See PLEADING, Vol. XIX, p. 229; ABATEMENT, Vol. I, p. 12; and in these Supplements.

PLEASANT GROVE, a village of Utah Co., central-northern Utah, 30 miles S.S.E. of Salt Lake City, on the Union Pacific railroad, in a farming and fruit-raising district; has two churches and a steam saw-mill. Population, 1900, 2,460.

PLEASANTON, ALFRED, an American soldier; born in Washington, D. C., June 7, 1824. He was graduated from the United States Military Academy in 1844, served on the western frontier and later in the Mexican War. In 1862 he was commissioned major of the Second Cavalry and was made a brigadier-general of volunteers in the

same year. He served in the Peninsular campaign and was in the actions at Antietam and Fredericksburg. At Chancellorsville he performed important service by checking the farther advance of the Confederates, thus saving Hooker's army. In 1863 he was promoted major-general of volunteers and placed in command of the cavalry corps of the Army of the Potomac, with which he led at Gettysburg where for gallantry in action he was brevetted colonel in the regular army. In 1864 he was transferred to the Department of the Missouri. He defeated Gen. Price at Marais-des-Cygnes and forced the retreat of the Confederate forces from Missouri. In 1866 he retired from the volunteer service and until 1871 was United States internal revenue collector and commissioner. During his military career he participated in over 100 battles and won distinction for his bravery. In 1871 he became president of the Terre Haute & Cincinnati railroad and in 1888 was placed on the retired list of the United States army. He died in Washington, D. C., Feb. 17, 1897. W.M.C.

PLEBISCITE, the name given, in the political phraseology of modern France, to a decree of the nation obtained by an appeal to universal suffrage. Thus, Louis Napoleon, for example, was chosen President and subsequently Emperor, by a plebiscite. The word is borrowed from the Latin; but the *plebiscitum* of the Romans properly meant only a law passed at the *Comitia Tributa*, that is, assembly of the *plebs*, or "commons," as distinguished from the *populus*, or the "nobles"; and although it was ultimately obligatory on both classes of the community, it of course could only refer to such matters as it was within the province of the *Comitia Tributa* to legislate upon, and could not fundamentally alter or destroy the constitution, its powers being thus limited.

PLECOPTERA, a subdivision of the pseudoneuropterous insects. The name refers to the folding of the wings when the insects are at rest. The group includes the stone-flies (*Perlidæ*).

PLEIADE. See RONSARD, Vol. XX, p. 863.

PLEIADES, a group of stars in the constellation Taurus. Six of them are plainly visible to persons with ordinary sight; while persons with keener vision can distinguish eleven or more. More than four hundred stars properly belong to the group, which is now recognized as a single system with Alcyone as the center. The name of the group is derived from Greek mythology. The Pleiades were the seven daughters of Atlas and Pleione, hence were also called Atlantides. Their names were Electra, Maia, Taygete, Alcyone, Celæno, Merope and Sterope. All were visible but the last, who is said to have become invisible from shame, because she alone among her sisters had loved a mortal man. The Pleiades are said to have committed suicide out of grief at the death of their sisters, or at the fate of their father. They were afterward placed by Zeus as stars on the back of Taurus. The rising of the Pleiades in Italy was about the beginning of May, and their setting about the beginning of November. The navigation of the Mediterranean lasted about the same time. Hence these stars were objects of special interest to sailors in that region. See also ZODIAC, Vol. XXIV, pp. 829, 830.

PLEISTOCENE PERIOD. See GEOLOGY, Vol. X, p. 325.

PLESIOPIDÆ, a family of fishes, typified by the genus *Plesiops*, found in the Indian Ocean. The family was so named because of the peculiar approximation of the eyes. Aside from their anatomical features they have little importance.

PLEURA. See RESPIRATION, Vol. XX, p. 489.

PLEURODELIDÆ, a family of salamanders (*Urodela*) found in both hemispheres. The name of the typical genus *Pleurodeles* refers to the fact that the ribs protrude through the body-wall, and hence are externally visible. The genus, represented by a single species, is found in southern Europe, especially in Spain. The genus *Diemyctylus* contains most of the species of the family, seven being found in North America. The well-known triton of the Eastern states is *D. viridescens*.

PLEURODIRA, a genus of tortoises of the family *Chelydidæ*. This family is characterized by the inability to withdraw the neck, but which bends sidewise, and thus the head can be partly concealed beneath the carapace. These reptiles are confined to the southern hemisphere, but related fossil forms are found in the northern. *Chelodines* is an equivalent name.

PLEURONECTES. See ICHTHYOLOGY, Vol. XII, p. 730.

PLEURO-PNEUMONIA. See MURRAIN, Vol. XVII, p. 66.

PLIMSOLL, SAMUEL, philanthropist; born in Bristol, England, in 1824. He was educated at Penrith and Sheffield, became a solicitor's clerk, then manager of a brewery, and in 1853 engaged in business in London as a coal merchant, in which he became prosperous. He was elected to Parliament for Derby in 1868, and was member for that town until 1880, when he withdrew in favor of W. V. Harcourt. His purpose in entering Parliament was to influence legislation for the relief of sailors, and his withdrawal was for the same reason, since he thought that a cabinet minister could do more for the sailor's cause than a private member. In his work, *Our Seamen*, he made so vigorous an attack on the ship-owners that the public was enlisted strongly in the cause of the sailors. He afterward wrote a sequel to this work. While in Parliament he was instrumental in passing acts for the amendment of the shipping laws, especially a bill to establish a fixed load line, which he won by earnest advocacy. Since then "Plimsoll's line" has been marked on every English merchant ship. In 1890 he published a work on *Cattle Ships*, exposing the cruelties practiced in shipping cattle, and became president of the National Sailors and Firemen's Union. He died in London, June 3, 1898. G.J.H.

PLIOCENE ROCKS. See GEOLOGY, Vol. X, p. 322.

PLIOHIPPUS. See HORSE, Vol. XII, p. 177.

PLOCEIDÆ. See WEAVER-BIRD, Vol. XXIV, p. 489.

PLOESHTI OR PLOYESCHI, Roumania, a market town and railway junction of Great Wallachia, capital of the province of Prahova, 32 miles north of Bukarest. It has petroleum wells and allied industries. Population, 42,800. C.L.S.

PLOMBIERES, a town in the arrondissement of Remiremont, department of Vosges, northeastern France, about 15 miles S. of Epinal. It is picturesquely situated in the Valley of the Argonne, and is celebrated for its thermal springs, nearly fifty in number, which, owing to their curative powers, have been in use since the days of the Romans. The magnificent baths as they exist to-day were built by Napoleon III. The town has important manufactories of cutlery and other articles in iron and steel. Population 1901, about 2,000.

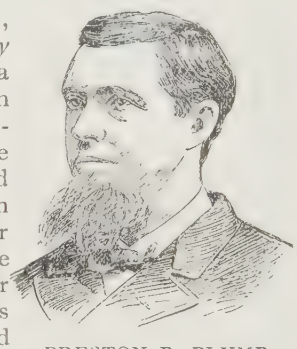
PLOTIDÆ. See SNAKE-BIRD, Vol. XXII, p. 198.

PLOTINUS. See NEO-PLATONISM, Vol. XVII, p. 345.

PLOUG, PARMO CARL, poet; born in Denmark in 1813. He began his poetical career as a composer of students' songs, which were written with much grace and wit, and became very popular. His dramatic works, of which he produced a number, were humorous and telling satires on the political and literary conditions of Denmark. His vigorous style, fine poetical sentiments, and literary skill, with his violent Scandinavian patriotism, made him the poet of the people. As editor of the *Fædrelandet*, a daily political newspaper, as also in his poetry, he became an earnest exponent of modern practical ideas and advocated the newest school of liberalism, while the war of 1848–50 with Germany aroused his sentiments to fanaticism. He died Oct. 27, 1894. G.J.H.

PLOWS, AMERICAN. There are numerous special varieties or types of American plows. The sulky plow is mounted on wheels, by means of which the weight of the plow and the furrow-slice are supported, thus reducing the friction and the draft; while the driver or plowman is seated, thus lightening his labor. Swivel or side-hill plows are those with reversible mold-boards, and are capable of being used to turn the furrow either way. These plows are useful in hilly fields, by means of which the furrows can be all turned one way—a great and evident advantage. Great improvements have been made in these swivel plows, and now they are used on level land, so that the "dead" or open furrows which have to be left in the center of the field, which is plowed on both sides, are avoided, as likewise the ridges occurring where the first furrows are laid with the old-style plow. The double Michigan plow has a small paring-plow on the beam in front of the other. The small plow pares off the surface and throws it into the previously made furrow, the large one following and completely burying the first slice under it. Special forms of plowshares are also made for ditching, for making underground channels for carrying off water in clay soils, for paring the turf, for cutting off the roots of weeds, for reclaiming land containing stones, brush, etc., and for other purposes. The Campbell system of cultivation, in vogue in the Dakotas, which consists in turning the sod or soil over in such a way as to make it as impenetrable to the drouth as possible, has also brought into use a new form of plow. The ingenuity and skill of construction shown so markedly in American plows has been much appreciated abroad, where they have a large sale and have proved to be patterns most worthy of imitation.

PLUMB, PRESTON B., legislator, born in Delaware County, O., Oct. 12, 1837. He learned the trade of printer; removed to Emporia, Kan., and founded the *Weekly News;* was in 1859 a member of the convention that asked for the admission of Kansas as a free state; studied law, and was admitted to the bar in 1861. He was a member of the Kansas legislature in 1862, in the same year enlisted in the army as second lieutenant, and rose to be lieutenant-colonel of his regiment, the 11th Kansas Volunteers. In 1867 he was speaker of the Kansas house of representatives; afterward was elected district attorney for Lyon County; but finally abandoned the practice of law to become president of the First National Bank of Emporia. He was elected to the United States Senate as a Republican in 1877, and was re-elected in 1883 and 1888. As such he served for a number of years as chairman of the Committee on Public Lands. He died at Emporia, Dec. 20, 1891. G.J.H.



PRESTON B. PLUMB.

PLUMBING, SANITARY. Plumbing (from the Latin *plumbum*, lead), the art of working in lead, was known to the ancients, but limited to water-supply. Conduits were rolled for this purpose. Sanitary plumbing deals with house-drainage, the ventilation of pipes and appliances and water-supply.

Sanitary plumbing stands in closer relationship to the health of the people than any other art or science. The germ theory of disease, and the fact that the microbe can be prevented from transportation and germination, places sanitary plumbing among the chief factors in all measures for the prevention and removal of disease.

The diseases arising from unsanitary conditions are known as zymotic. They include cancer, consumption, nearly all the diseases of childhood, epidemics, blood-poisoning, insanity, and degeneration of the brain, liver, kidneys and other organs. It is estimated that these diseases annually cause the death of half a million people.

Medical science pronounces the reckless, careless and ignorant disposal of human excremental products the most prolific source of disease. It therefore becomes necessary that they be quickly removed. The underground sewer is the safest means of disposal, but the sewers generate gases that cause the diseases above named. Sewer-gas must therefore be confined, and this is the work of sanitary plumbing. This is impossible, however, without the aid

of state and municipal sanitary law. Sanitary plumbing can prevent the ingress of sewer-gas; it can prevent the impregnation of the soil from dangerous moistures; but where the water-supply has become vitiated, it cannot prevent the return of disease-germs through water-mains. It can only suggest filtration or the boiling of drinking-water. It is therefore of vital importance that sanitary plumbing should be demanded and enforced by state and national legislation.

House Drainage and Ventilation of Pipes. The trap is the only protection against the ingress of sewer-gas known to sanitary science. A trap is a crook or bend in lead, iron or brass pipe, or other material, which forms a pocket for the retention of water. This water obstructs the passage of sewer-gas. To prevent "siphonage," air must be admitted at the crown of the trap to equalize the atmospheric pressure. The trap most in use is known as the "S" trap. Its water-seal is not over one and a half inches in depth. However properly the trap may be "back-vented" (which is the term for admitting air into the crown of the trap to prevent siphonage), it may lose its seal by evaporation or capillary attraction, and possibly other causes. It is therefore very essential that intelligent care be given to plumbing apparatus. Even if the seal of traps should not be destroyed, the fouling of the water must be avoided by the regular flushing of fixtures. In the house-drainage system, air circulation must be maintained to relieve the pressure of sewer-gas upon the seal of the trap. Under sufficient pressure, sewer-gas will penetrate the deepest water-seal. A "fresh-air inlet" is the method to secure air circulation in the house sewer. The house sewer should be run in as direct a line as possible from the street sewer to the highest point of the roof. From the street sewer to within a few feet of the foundation-wall, salt-glazed or vitrified sewer-pipe is generally used, and should be laid in a bed of cement. All house sewers or drains should have a fall of not less than one foot in fifty.

The main house sewer and trap should be of extra-heavy cast-iron pipe, coated inside and out with pitch or coal-tar applied hot. It should be not less than four inches in diameter, and should extend several feet beyond the foundation-wall. This pipe connects with the trap which cuts off the house system from the street sewer. This trap, which is usually a running or half "S" trap, should be provided with a four-inch hand-hole or clean-out on the sewer side and a four-inch vent-opening on the house side. The hand-hole of this sewer-trap should be air-tight and left easy of access, to expedite cleaning. The vent-opening should be connected with four-inch cast-iron pipe, carried up at least a foot above the ground and properly capped. This constitutes the usual form of fresh-air inlet. Nearly all authorities agree that the fresh-air inlet, whether located in the yard or at the gutter-curb, is essential to the maintenance of air circulation in the drainage system.

All plumbing fixtures, properly trapped and vented, should discharge into this main line of soil-pipe. There should be no trap, other than the one above described, or acute angles in this main drain. All changes in direction of this pipe should be made with not less than one eighth bends or sanitary "Y" branches, the free openings of which should be fitted with four-inch brass trap-screws to facilitate cleaning. The joints in cast-iron soil-pipe should be packed with spun oakum, filled with molten lead and thoroughly calked. All connections of lead with cast-iron should be made with brass or combination brass ferrules, one end calked into the hub of the soil-pipe and the other joined to the lead pipe by "wiped" or overcast joints. Before fixtures are set, the entire line of house soil-pipe should be left exposed for inspection and test, as a provision against defective joints or sand-holes. The soil-pipe should be securely fastened to the wall, ceiling or joists, with iron hangers or hooks to prevent sagging at the joints and forming pockets for soil obstructions. The main soil-pipe and separate vent-pipes, which extend through the roof, should be increased one inch in diameter by the use of soil-fittings, known as "increasers." The ends of such pipes should remain open or protected by wire-netting. Closets, bathtubs and lavatories can be vented into the main soil-pipe if the vent connection is made two to four feet above the highest fixture discharging into it. Separate vent-pipes, however, can be run from the fixtures directly through the roof. All vent-pipes should have sufficient fall to avoid the accumulation of water by condensation. Rain-water leaders should be trapped at their base and carried through separate sewer drains into the main house sewer on the house side of sewer-trap. Waste-pipes from refrigerators, safes and ice-boxes should not connect directly with the soil-pipe, but should discharge into open sinks properly trapped. Waste-pipes from refrigerators should be trapped at the refrigerator end. The outlets of refrigerator waste-pipes should be protected with flap-valves. Kitchen sinks should be supplied with grease-traps. Grease should not be allowed to enter the drainage system. These traps should be cleaned at least once a week.

House Water-Supply. In house water-supply, sanitary plumbing has also to do with the problem of economy and health. The water-supply should be so arranged from its source, that in case of light pressure the drinking-supply could not be contaminated by foul water lodging in the plumbing fixtures. All water-pipes should drain to certain points, at which should be located stop and waste cocks placed below the frost-line. Rods from these cocks should extend up into the house at convenient points to facilitate the shutting off of the entire house system. Hot-water pipes from range boilers to bath-rooms should be brass, iron-pipe size, or lead. Lead pipe is subject to the contraction of heat and cold, and must be properly connected and set when used as hot-water conductors. Cold-water pipes from the street-main to fixtures should be extra-strong lead pipe. Exposed pipes on bath-room fixtures should be nickel-plate brass. The supply-pipes of closets should be equipped with separate cut-off cocks above the floor, in order that repairs may be made without disturbing other fixtures. All waste-pipes should be lead. In connecting closets to soil-pipe, brass flanges and rubber

gaskets should be used. No vent-pipe should be smaller than its trap, except in case of closet-traps, the vents of which should be not less than two inches. All plumbing work should be exposed or placed under movable covers, to facilitate repairs.

Fixtures. To expedite the work of the sanitary engineer, plumbing fixtures should be intelligently selected. There should be no woodwork or casing around bathtubs, lavatories, sinks, slop-hoppers, closet or laundry trays. Enameled iron, rolled edge or solid porcelain bathtubs and sitz baths should be used. If copper tubs are used they should be of the pedestal style, standing away from the wall and with no woodwork but the bath rim. Closets should be selected with great care. Cheap and defective closets cause great expense to repair, and are dangerous to health. Cheap closets are responsible for the enormous and burdensome water-waste which has grown to such alarming proportions in recent years. The United States consumes one hundred gallons of water a day per capita in the cities. Germany allows only forty gallons per capita and England thirty-four. The water-waste in this country can be almost entirely stopped by economical water-using closets. Sanitary science has made more improvement in closet-building in recent years than in any other line of plumbing apparatus. There is now no excuse for the selection of defective and dangerous closets.

Patrick J. Madden of Chicago is the inventor and patentee of a line of closets which mark a new era in closet-building. These remarkable fixtures combine hygienic and sanitary security, mechanical simplicity, strength and durability. They are especially constructed to overcome water-waste in public and private use. A place is given them here because they are the first closets produced that have successfully passed the disease-germ and mephitic-gas test, securing scientific indorsement. These closets are of the siphon jet type, holding the deepest water-seal yet attained in bowl construction, and entirely overcoming the intermittent outflow which condemned earlier attempts at producing the jet closet. Mr. Madden is the pioneer in embodying his improved jet principle in enameled iron, enameled inside and out. This closet is automatic in action, and designed especially for public-building purposes.

A residence or public building with a system of drainage and water-supply as suggested above, and provided with properly selected plumbing fixtures, is protected against zymotic diseases. Such a system is economical. Cities having sewers should have ordinances to regulate them. Each state should have a law providing a board of commissioners to examine applicants for plumber's license, and to examine applicants for the office of plumbing inspector.

This article necessarily omits a vast amount of detail appertaining to the subject. Much valuable information may be found in the plumbing ordinances of different cities.

James B. Clow.
Albert E. Hyde.

PLUM-KNOT, a name given to *Plowrightia morbosa*, a black fungus which attacks the twigs of the plum and cherry, producing black, knot-like masses. The young bark is penetrated by the parasitic threads, which in spring multiply greatly, and finally break through the bark, forming a dense tissue which grows rapidly and becomes almost solid, with a black velvety appearance. These knots bear the spores, which fall off easily and spread the disease. The parasite is often quite injurious, and the knots should be cut off as soon as they appear.

PLUMMER, William, an English astronomer; born in Deptford, in Kent, in 1849. He entered the service of the Royal Observatory, Greenwich, and in 1870 became connected with Bishop's Twickenham Observatory, which was engaged in the formation of charts of the stars situated near the ecliptic, to facilitate the discovery of minor planets. Then, on the establishment of the Oxford University Observatory in 1874, he was appointed assistant, where he was engaged in photometric and meridional observations. In 1892 he was appointed astronomer to the Mersey Docks and Harbor Board, and director of the Liverpool Observatory. He was elected a member of the Royal Astronomical Society in 1879, and to a seat on the Council in 1888. In 1889 he received the honorary degree of M.A. from the University of Oxford. He wrote *The Motion of the Solar System in Space; The Sidereal System*; etc.

PLUM-POCKETS, a disease of plums caused by the parasitic fungus *Exoascus pruni*. Through the attacks of this fungus the plums become cupped and swollen.

PLUMPTRE, Edward Hayes, educator; born in Fredville, Kent, England, Aug. 6, 1821. He was educated at Oxford, graduating in 1844; was ordained in 1846, and in 1847 joined the staff of King's College, London. His work lay chiefly in this institution for 21 years, its scope being enlarged by his introduction of evening classes. He was chaplain there in 1847–68, professor of pastoral theology in 1853–63, and professor of exegesis in 1864–81. He was also engaged during this period in clerical work, and was Boyle lecturer in 1866, his lectures being afterward published under the title *Christ and Christendom*. He resigned his college work in 1881 to become dean of Wells, to which new field of work he proved very well adapted. He was throughout an active writer, publishing *Biblical Studies* (1871); *St. Paul in Asia* (1871); *Theology and Life* (1884), and other works on religious topics. In 1888 he issued a little work on *Wells Cathedral and Its Deans*, and also *Life of Bishop Ken*. Plumptre published several volumes of verse, including *Lazarus; Master and Scholar*, and *Things New and Old*. He died at Wells, Feb. 1, 1891. G.J.H.

PLUTONIC ROCKS. See Geology, Vol. X, pp. 273–277.

PLYMOUTH, the great southwestern port of England, in Devonshire, and on the north side of Plymouth Sound, 42 miles S.W. of Exeter and 246 W.S.W. of London. What is known as Plymouth is three distinct towns, under separate local governments, and called by the inhabitants the "Three Towns." From the precipitous Hoe, a hill 100

feet high, on the seaward side of the town, with houses climbing up its landward side, a magnificent prospect is obtained of Plymouth and its surroundings. Confining the broad Sound on the south is the breakwater, while on the extreme verge of the horizon rises the Eddystone Lighthouse. The mother-church of Plymouth, St. Andrew's, is a fine specimen of the characteristic church architecture of the Perpendicular period, to which date it mainly belongs. In 1874–75 it was "restored" by the late Sir G. G. Scott. Other churches are Charles's Church, Christ Church Trinity, All Saints', St. Matthias's, St. Jude's, St. Luke's, St. Peter's, St. James's, and many others; the Roman Catholic cathedral (founded 1856), a fine early-English structure, with a tower 205 feet high; and several modern Dissenting chapels. The number of small religious bodies is exceptionally large, comprising Universalists, Bible Christians, Moravians, Christadelphians, Plymouth Brethren, Calvinists, etc. The chief secular building is the Guildhall, an early-English structure built in 1870–74, and forming, with the municipal buildings, St. Andrew's Church, and the new general postoffice adjoining, a picturesque and harmonious group. Other remarkable buildings are the South Devon and East Cornwall Hospital; the Royal Hotel and Theater; the Duke of Cornwall Hotel, at the Millbay railway station; the Plymouth Institution (literary and scientific), extended by the addition of a museum in 1829; the Mechanics' Institute; Co-operative Hall; Freemasons' Hall, and People's Palace; the Technical and Science and Art schools (built to commemorate the jubilee of the reign of Queen Victoria), and the Grand Hotel upon Hoe. The War Department in 1885 presented the corporation with the whole of the outworks and glacis of the Citadel—sixteen acres, which have been added to the Hoe, and have increased the attractions of this historic quarter; and on it has been erected the *first* marine biological laboratory and aquarium in the kingdom—a fine building devoted to scientific researches into the habits and culture of fish and economic development of the fishing industry. Plymouth now rivals Southampton as a station for the mail-steamers, and, as a port of call, is the headquarters of the Royal Western Yacht Club of England. It is one of the chief ports in the kingdom for the importation of cattle, and also largely imports sugar, saltpeter, hemp, hides, timber, grain and wine. The industrial products, widely exported, are principally chemicals, soaps, artificial manure, starch, black-lead, refined sugar, gin, biscuits, candles, cement, and the beautiful native marbles. There are considerable shipbuilding-yards, foundries, engineering, clay and stained-glass works, tar distilleries; while in the district are serge factories, paper and shoddy mills, granite quarries. The town sends two members to Parliament, and Devonport, with Stonehouse, the same number. Population of Plymouth Parliamentary borough, 87,480; and county borough, 84,248; (1901), 107,509.

PLYMOUTH, a city and the capital of Marshall County, northern Indiana, 40 miles N. of Logansport and 24 miles S. of South Bend, on the Yellow River, and on the Pennsylvania, Lake Erie and Western and the Vandalia Line railroads; has flour, saw and planing mills; lumber and grain are extensively shipped. Population 1890, 2,723; 1900, 3,656.

PLYMOUTH, a port of entry and the capital of Plymouth County, Massachusetts. It is situated 37 miles S.E. of Boston, on the Plymouth division of the New York, New Haven and Hartford railroad (Old Colony System). The township, which includes the villages of Chiltonville, North Plymouth, Cedarville, Ellisville, Halfway Pond, South Plymouth, West Plymouth, Red Brook, Saquish, Wellingsly and Manomet, has for its principal industries the manufacture of cordage, cotton duck, bed-fastenings, tacks, nails, woolens, boots and shoes. Population 1900, 9,592. The landing-place of the Pilgrim Fathers (q.v., in these Supplements), and the oldest town in New England, Plymouth received appreciative treatment in Vol. XIX, p. 249.

Pilgrim Hall, erected in 1824 by the Pilgrim Society, as a memorial hall to the memory of the

PILGRIM HALL, PLYMOUTH.

Pilgrims, was built over and remodeled in 1880 at the expense of J. H. Stickney, of Baltimore, Maryland, one of the vice-presidents of the Pilgrim Society. Within its walls is displayed a collection of paintings relating to Pilgrim history, three of which, by their size and beauty, are especially prominent. The first in point of time is *The Landing of the Pilgrims at Delft Haven*, by Henry Sargent, of Boston, presented by him to the society in 1834. It measures 13 by 16 feet. Next comes a copy of Weir's *Embarkation of the Pilgrims*, from the original in the capitol at Washington. It was painted for the society by Edgar Parker, of Boston, and measures 8 by 12 feet. The third is the *Embarkation from Plymouth, England*, painted by an English artist and presented to the society by ex-Governor Alexander H. Rice, of Boston. Its size is 11 by 12 feet. In addition to these, there are portraits of persons eminent in Pilgrim history; a large collection of articles brought over in the *Mayflower*, and in a lower hall a general collection of curiosities of much interest.

One of the most prominent features of the town is the National Monument to the Forefathers. The corner-stone was laid Aug. 2, 1859; the main pedestal was put in position in 1876, and the statue of

Faith erected in the following year. The monument was completed in October, 1888, and dedicated with appropriate ceremonies on Aug. 1st, 1889. The entire work was under the control of Hammatt Billings, who drew the design for the monument in all its details. Massive in its grandeur, it is built entirely of granite, the statues all being quarried by the Hallowell Granite Company of Maine. The plan of the principal pedestal is octagonal, with four small and four large faces, from the former of which project four buttresses. On the main pedestal stands the colossal figure of Faith, the largest and most inspiring piece of granite statuary in the world. It is 216 times larger than life size, and weighs over two hundred tons. The pedestal is 45 feet high and the statue 36 feet, making a total height of 81 feet. The outstretched arm measures, from the shoulder to the elbow, 10 feet 1½ inches; from the elbow to the top of the uplifted finger, 9 feet 9 inches. The head measures 13 feet 5 inches around the temples. The points of the star on the forehead are just 1 foot across. The length of the finger pointing upward is 2 feet 1 inch, and it measures 1 foot 8½ inches around. The circumference of the wrist is 4 feet, and of the neck 9 feet 2 inches. This noble figure was the

NATIONAL MONUMENT, PLYMOUTH.

gift of Oliver Ames, of Easton, a native of Plymouth, and cost $30,300. The sculptor was Joseph Archie, a Spaniard, considered one of the most skillful artists in the country. Upon the four buttresses are seated figures emblematical of the principles upon which the Pilgrims founded their commonwealth—Morality, Education, Law, and Freedom. Each was carved from a solid block of granite. On the faces of the buttresses, beneath the four figures, are *alto-relievos* in marble, representing scenes from Pilgrim history. The statue of Morality was presented by the state of Massachusetts; the marble tablet beneath it with the scene of the Departure from Delft Haven, by the state of Connecticut. The statue of Education, with the panel under it, representing the Signing of the Social Compact in the cabin of the *Mayflower*, was the gift of Roland Mather, of Connecticut. The statue of Freedom, with its accompanying *alto-relievo* of the Treaty with Massasoit, was the gift of the United States. The statue of Law, with the relief of the Landing on Plymouth Rock, was mainly contributed by the legal profession. Upon the four faces of the main pedestal are large panels for records. That in the front bears the inscription: "National Monument to the Forefathers. Erected by a grateful people in remembrance of their labors, sacrifices and sufferings for the cause of civil and religious liberty." The right and left panels contain the names of those who came over in the *Mayflower*. The rear panel has been left blank for an inscription at some future date. See also PILGRIM FATHERS, in these Supplements.

PLYMOUTH, a village of Wayne County, south eastern Michigan, 24 miles W.N.W. of Detroit, on the Detroit, Lansing and Northern and the Flint and Père Marquette railroads; has a large windmill factory, washing-machine, cheese and air-rifle factories, and various other industries. Population 1890, 1,172; 1900, 1,474.

PLYMOUTH, a village and one of the capitals of Grafton County, central New Hampshire, 37 miles N.N.W. of Concord and 19 miles N.W. of Laconia, on the Pemigewasset River, and on the Boston and Maine railroad; has manufactures of buckskin gloves, shoes and boxes, and a state normal school. Population 1890, 1,852; 1900, 1,972.

PLYMOUTH, a town and the capital of Washington County, eastern North Carolina, 105 miles E. of Raleigh, on an inlet which opens into the west end of Albemarle Sound, and on the Atlantic Coast railroad. It is partly supported by the coasting trade and fishing; cotton and lumber are shipped here; steamers leave here for Baltimore and Norfolk. Population 1900, 1,011.

PLYMOUTH, a village of Richland County, northern Ohio, on the Huron River, and on the Baltimore and Ohio and the Northern Ohio railroads; has saw, planing and flour mills, carriage and wagon shops. Population 1890, 1,133; 1900, 1,154.

PLYMOUTH, a borough of Luzerne County, Pennsylvania. It has a high-school, four public-school buildings, a national bank, and three weekly papers. Population 1890, 9,344; 1900, 13,649. See PLYMOUTH, Vol. XIX, p. 250.

PLYMOUTH, a village of Sheboygan County, east-southeastern Wisconsin, 15 miles W. of Sheboygan and 51 miles N. of Milwaukee, on the Chicago, Milwaukee and St. Paul and the Chicago and North-Western railroads, and on the Mullet River; has furniture and chair factories, foundry and machine-shop, breweries and flour-mills. Cheese is extensively manufactured in the vicinity; is in a dairying and grain-raising section. Population 1890, 1,503; 1900, 2,257.

PLYMOUTH ROCK, a bare rock on "the bleak coast of Massachusetts Bay," upon which the Pilgrim Fathers (q.v., in these Supplements) landed Dec. 21, 1620, "while all around the earth was covered with deep snow." The rock became known as Plymouth Rock. The first persons supposed to have stepped upon the famous rock were Mary Chil-

ton and John Alden. Though tradition has not entirely determined this interesting point, the landing is itself a matter of certain tradition; elder Thomas Faunce, in 1741, then in his ninety-first year, declaring that he had heard of it from the oldest planters. In process of time one part of the rock became broken, and in 1774 it was taken to the center of the town of Plymouth and surrounded by an iron railing. This portion was dragged into its new position by twenty yokes of oxen. Over this stone in this position the Whigs erected a liberty-pole. In 1880 the stone was returned to its original position at Hedge's Wharf. See also PLYMOUTH, in these Supplements.

PLYMPTON, GEORGE WASHINGTON, civil engineer; born in Waltham, Mass., Nov. 18, 1827; was graduated at the Rensselær Polytechnic Institute in 1847; was professor of architecture and engineering at Cleveland University in 1852–53; professor of mathematics at the New York State Normal School in 1853–56; professor of physics and engineering at the New Jersey State Normal School in 1857–63; became professor of physics and engineering at the Brooklyn Polytechnic Institution in the latter year, and of the same chair at Cooper Union, New York, in 1869, and was professor of chemistry and toxicology at the Long Island College Hospital in 1864–86. In 1870–86 he was editor of Van Nostrand's *Engineering Magazine.* He is the author of *The Blowpipe; How to Become an Engineer; The Starfinder; The Aneroid*, etc.

G. J. H.

PNEUMATIC DYNAMITE GUN. See DYNAMITE GUN, in these Supplements.

PNEUMATIC SULKY, a trotting-sulky having pneumatic tires on the wheels. These wheels were first tried as an experiment, the idea being borrowed from the bicycle. Previously, it was supposed that a light wooden wheel, of about four feet diameter, was the best thing for a trotting-sulky; but the smaller pneumatic-tired wheel was found to reduce the time for a mile by three or four seconds, and has been universally adopted for trotting-sulkies, the seat of the driver remaining at the former height, a special framework being adopted to accommodate it to the low wheels.

PNEUMATIC TIRES. See BICYCLE, in these Supplements.

PNEUMATIC TRANSMISSION. See PNEUMATIC DESPATCH, Vol. XIX, p. 251; and AIR-COMPRESSORS, AND USES OF COMPRESSED AIR, in these Supplements.

PNEUMOGASTRIC NERVE. See PHYSIOLOGY, Vol. XIX, p. 49.

POCAHONTAS, a town of Tazewell County, western Virginia, 33 miles N. of Marion, on the Norfolk and Western railroad. Here is located one of the largest mines of bituminous coal in the state, employing several hundred miners. Population 1890, 2,953; 1900, 2,789.

POCAHONTAS. See SMITH, Vol. XXII, p. 185 (note).

POCHIN, HENRY DAVIS, an English chemist; born in Wigston, Leicestershire, in 1824; studied chemistry at the Pharmaceutical Society of London; and engaged in business as a manufacturing chemist in Manchester. He discovered the means of decomposing China clay (silicate of alumina) by sulphuric acid, and patented the process in 1855, the material being introduced into commerce as "aluminas cake." It is used by paper-makers for sizing paper. He also patented, in conjunction with Mr. Edward Hunt, a process for the purification of rosin by means of distillation. The rosin resulting from this process of purification is largely used in making pale yellow soaps, and is the foundations of almost all fancy soaps. He took great interest in educational matters, and published *Parliamentary Reform*, a pamphlet which met with favor. Died Oct., 1895.

PODESTA. See ITALY, Vol. XIII, p. 484.

PODGORITZA. See MONTENEGRO, Vol. XVI, p. 807.

PODICIPEDIDÆ. See GREBE, Vol. XI, p. 79.

POE, ORLANDO METCALFE, an American soldier; born in Navarre, Ohio, March 7, 1832. He was graduated from the United States Military Academy in 1856 and assigned to the engineer corps. In 1861 he was chief of engineers in the Department of the Ohio and in the same year was commissioned colonel of the Second Michigan volunteers. He served in the Virginia and Maryland campaign and in 1862 was appointed brigadier-general of volunteers. In 1863 he was mustered out of the volunteer service and became chief of engineers in the 23rd corps of the Army of the Ohio. He served in a similar position under Sherman in his historic invasion of Georgia, and was brevetted brigadier-general in the regular army in 1865. From 1865 to 1870 he was engineer-secretary of the United States Light-house Board at Washington, and in 1873 was engaged in constructing the light-house on Spectacle reef, Lake Huron, and had charge of various river and harbor works in the Great Lakes. He was a member of the United States Board of Light-house Commissioners, and later was chief engineer of the Northwest district, with rank of Colonel of Engineers. He died in Detroit, Mich., Oct. 2, 1895.

W. M. C.

POET LAUREATE. See LAUREATE, Vol. XXVII, p. 554.

POEY, ANDRÉS, a Cuban meteorologist; son of Felipe Poey; born in Havana, Cuba, Jan. 27, 1826. He was sent abroad as a youth, was educated in Spain and began the study of meteorology at the age of 19. He became director of the observatory of Havana in 1860 and began writing on meteorological subjects for European reviews and periodicals. His published writings include meteorological works on Cuba, Mexico and Central America, all of which are published in Spanish. In 1876 he published a book on Cuban antiquities.

W. M. C.

POEY, FELIPE, a Cuban naturalist; born in Havana, Cuba, May 26, 1802. He was educated

in Spain, being graduated from the University of Madrid in 1824. He then continued his studies in Paris, where in 1827 he aided in founding the *Société Entomologique*. He returned to Havana in 1833 where he made a study of Cuban *fauna* and in 1842 became professor of comparative anatomy and zoölogy at the University of Havana. In 1863 he was transferred to the chair of botany, mineralogy and geology at the same university. He was a member of nearly all the leading scientific societies in Europe and America, and in 1883 received a gold medal at the Amsterdam Exposition for his discoveries and achievements. Many of his collections are preserved in the National Museum at Madrid. His writings include *Geografia Universal* (1836); *Corona Poeyana* (1844); *Geografia de Cuba* (1855); *Memorias sobre la Historia Natural de la Isla de Cuba* (1860); *Enumeratio Piscium Cubensium* (1875). His important work, *Ictiologia Cubana*, was unpublished at the time of his death, which occurred in Havana, Cuba, Jan. 28, 1891. W.M.C.

POGE, Cape, Massachusetts, the northernmost point of Chappaquiddick Island, Martha's Vineyard, Dukes County, projecting into Nantucket Sound midway between Muskegat Channel and Vineyard Sound. A lighthouse of the fourth class marks the point. C.L.S.

POGODIN, Michael Petrovitch, historian; was born at Moscow, Russia, on November 23, 1800, and devoted himself chiefly to historical works concerning Russia. Among his publications were *The Origin of the Russians* (1823); *Character of Ivan the Terrible* (1828); *Complicity of Godunoff in the Murder of Demetrius* (1829); *History of the Pseudo-Demetrius* (1835); *Russian History* (7 vols., 1846–54, left unfinished); *Researches on the Historic Basis of Serfdom* (1858), and *The First Seventeen Years of the Reign of Peter the Great* (1875). He also wrote a tragedy, *Martha Posadniza* (1831), and *Stories* (1833). He was one of the foremost promoters of the Pan-Slavic movement and did much to arouse a true spirit of nationality among the peoples of Russia. He died at Moscow on December 20, 1875. W.F.J.

POINSETT, Joel Roberts, diplomatist; born in Charleston, S. C., March 2, 1779. Many years of his early life were spent in Europe, at school and in travel, and on his return in 1809 President Madison sent him to South America to investigate its conditions. He afterward served in the South Carolina legislature and in Congress; was sent as an envoy to Mexico in 1822, and as United States minister to that country in 1825. He seconded President Jackson in opposing nullification in South Carolina, and was Secretary of War under President Van Buren. He died in Statesburg, N. C., Dec. 12, 1851. G.J.H.

POINT ALPHABET. See Blind, in these Supplements.

POINTE À PITRE, a town. See Guadeloupe, Vol. XI, p 204.

POINT PLEASANT, a village and the capital of Mason county, western West Virginia, on the Ohio River, near the Kanawha, and on the Ohio River railroad. It produces machinery, flour, barrels, lumber, coal and salt. Population in 1890, 1,853; in 1900, 1,934.

POINTER. See Dog, Vol. VII, p. 286.

POISON-IVY, a name given to *Rhus toxicodendron* a plant of the family *Anacardiaceæ*, and common everywhere in low grounds, climbing by rootlets over rocks, ascending trees, etc. It may be recognized by its three ovate, often-toothed leaflets, which are somewhat downy beneath. It is poisonous to the touch for most people. The allied *R. venenata*, poison sumach, is still more virulent. The other members of the genus are the well-known sumachs.

POISON OF SERPENTS. See Snakes, Vol. XXII, p. 201.

POISONOUS FOOD. See Medical Jurisprudence, Vol. XV, p. 792.

POKEWEED FAMILY, a small family represented in the United States by the single species *Phytolacca decandra*, or common pokeweed. It is also called scoke or garget, and is a well-known coarse herb of low ground, with large, poisonous root, long racemes of white flowers, and dark crimson-purple, juicy berries.

POLAND, Luke Potter, an American lawyer and public man; born in Westford, Vt., Nov. 1, 1815. He received an academic education, studied law, and was admitted to the bar in 1836. He was register of probate, 1839–40, and prosecuting attorney of Lamoille County, 1844–45; member of the State constitutional convention, 1843; judge of the supreme court, 1848–65 (chief justice, 1860–65), resigning in the latter year to become United States senator to fill a vacancy. He was Representative in Congress from Vermont, from March 4, 1867, to March 3, 1875; was elected to the State House of Representatives, 1878; was trustee of the University of Vermont; president of the First National Bank of St. Johnsbury for twenty years; chairman of the National Bar Association; and again Representative in Congress from Vermont from Dec. 3, 1883, to March 3, 1885. He died in Waterville, Vt., July 2, 1887. E.E.T.

POLAR CLOCK, a device of Sir Charles Wheatstone's, based upon the fact that the light of the sky is reflected light, and therefore partially polarized, its plane of polarization being always at right angles to the sun. The instrument will indicate the apparent time of the sun, so long as there is any space of blue sky near the polar star exposed for observation. As the earth turns on its axis, giving the sun an apparent motion from east to west, the beam of light reflected from the clear space in the sky will follow these variations in position and indicate them upon a suitable plate or dial. The result is a close approximation to solar time.

*POLAR EXPLORATIONS SINCE 1880. Antarctic. In the summer of 1892–93 the Norwegian Captain Larsen, in the *Jason*, discovered on the east coast of Seymour Island, 64° 10′ S., 57° W., fossils of coniferous trees, possibly pertaining to the

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lower tertiary age, which indicate a warmer Antarctic climate in ages past. The next summer, in the year 1893, Larsen made extensive discoveries, which clearly demonstrated that Palmer Land of 1821 extends uninterruptedly southward and forms part of the continent of Antarctica. Larsen on Dec. 6, 1893, reached 68° 10′ S., 60° W., the coast which he followed being high, rocky, and mostly covered with ice. From his farthest point, high land, covered with snow, was seen in about 69° S., from 55° to 60° W. East of Graham Land—the southern extension of Palmer Land—in 65° 7′ S., 58° 22′ W., were discovered seven islands, two of them covered with volcanoes, which Larsen visited. In 1894 Captain Svend Foyn, in the Norwegian whaler *Antarctic*, visited the southern seas for whales. The Antarctic circle was crossed in 174° E. on Dec. 31. After 38 days in the ice-pack, Foyn found open water, and, steering for Victoria Land, reached 74° S. Landings were made on Possession Island and at Cape Adare, Jan. 23, 1895, where innumerable penguins were found nesting. The significance of this voyage, along the coast discovered by Ross in 1842, lies in the discovery by a Norwegian, C. E. Borchgrevink, both at Cape Adare and on Possession Island, of a lichen, the first vegetable growth ever noted within the Antarctic circle.

Arctic. Since 1876 Denmark, through its officers and scientists, has made most extensive exploration in Greenland, from Cape Farewell to the 66th parallel on the east coast and to the 76th on the west. Over 2,000 square miles have been exhaustively examined to the westward alone; investigations have related to the inland ice, its debouching glaciers, the flora and fauna of its ice-free coast, and the physical conditions of the adjacent sea. On the east coast special studies have been made of the east-Greenland natives, an isolated people numbering 600 souls.

In the Julianhaab district, Holm in 1880 visited 300 prehistoric ruins, comprising well-built stone churches, crosses, etc., which proved their builders to have been European and Christian. These archæological explorations were continued in 1894 by Lieutenant Brunn, with interesting results. In this district, in 1893, Lieut. T. V. Garde crossed the inland ice from Sermiatsialik fiord to Ikersauk, passing the ice-crest at an elevation of 7,300 feet in 61° 54′ N., 100 miles inland.

On the east coast, extensive explorations were made in 1883–85 by Holm, Garde and Knutsen. At Lindenows fiord, 62° 15′ N., were found Scandinavian ruins. In a journey to 66° 8′ N., along a coast lined with extraordinarily high icebergs, five ice-fiords were discovered, and the natives report another in 68° N. Wintering at Angmasalik, 65° 57′ N., among natives who had never seen Europeans, Holm gathered most interesting ethnological data. South of the 68th parallel there were 500 Eskimo, some fair-haired, with wonderfully oval and European-like faces. In 1891 Lieutenant Ryder wintered in Scoresby Sound, 70° 27′ N., 26° W., explored several fiords 50 miles inland, and found the mainland ice-clad. Ryder saw 160 flowering-plants, 32 kinds of birds and many mammalia. Following the explorations of the east coast, Denmark has established a missionary, trade and meteorological station at Angmasalik, which, annually visited by government vessels, insures the future welfare of the natives. In 1893 R. Knudsen explored the east coast near the 68th parallel, and made important corrections in the charts of the coast between 29° and 40° W.

Exploration in Greenland was immensely stimulated by Nordenskiold's initiation across its ice-cap. His second journey was made in 1883, from the head of Aulitsivik fiord, south of Disco Bay. Crevasses stopped the main party, July 21, in 48° 15′ W., at an elevation of 4,900 feet. His Lapps proceeded on *skis* 140 miles farther, to 6,600 feet, in 68° 32′ N., 42° 50′ W. The crest of the ice was still to the east, but they were then nearer to Sermilik fiord of the east coast than to their starting-point. Later, Nordenskiold rounded Cape Farewell in the *Sofia*, followed the east coast, and, passing Graah's farthest, discovered and explored King Oscar harbor, 65° 35′ N., 37° W.

The first man to cross Greenland was Dr. Fridtjof Nansen, who started from the east coast. A Norwegian sealer attempted fruitlessly for weeks to land him, and when Nansen took to boats he was carried 200 miles south by the ice-stream. Landing at Anoritok, 62° 5′ N., he eventually took the inland ice at Umivik, 64° 45′ N., on Aug. 10, 1888, with five sledges. After 17 days they were only 40 miles inland, at an elevation of 7,000 feet, in 64° 50′ N. Constrained by circumstances, Nansen changed his course toward Godthaab, 64° N., instead of toward Christianhaab, 68° N. The crest of Greenland proved to be a broad plateau nearly 9,000 feet high, with a gentle western slope that permitted the travelers to sail long distances. They reached, September 29th, Kangersunek fiord, 60 miles south of Godthaab. This hazardous journey showed that the ice-cap of south Greenland is of unbroken continuity.

More important were the journeys of R. E. Peary, United States Navy, farther to the north. In 1886 he advanced fifty miles inland from Disco, on the ice-cap. In 1891 he made his winter quarters at McCormick Bay, about 77° 45′ N., 71° W. May 14, 1892, he started across the inland ice with 16 dogs and 4 sledges. From a point 130 miles inland, Peary and Astrup advanced alone. Turned by crevasses from Peterman and St. George's fiords to the east, they reached the north edge of the ice-cap under the 82d parallel, whence across an inlet they saw to the north the comparatively ice-free land discovered by Lockwood in 1882. Eventually, Peary reached, July 4, Navy Cliff, Independence Bay, 4,000 feet high, in 81° 37′ N. To the northeast was an ice-free land extending to 25° W.; to the east, the Spitzbergen Ocean. Killing five musk-oxen, they returned, crossing the divide at 8,000 feet. Renewing his explorations in 1893 from an adjacent base, Bowdoin Bay, with 8 men, 12 sledges and 92 dogs, Peary saw his utmost efforts fail under adverse weather. After traveling 134 miles he cached his food and abandoned the trip, losing 66 dogs. Astrup ex-

plored Melville Bay, and the main party returned to the United States that autumn, but Peary remained another winter, with two men. In 1895, with 6 men (4 Eskimo), 6 sledges and 63 dogs, Peary made a journey of extraordinary danger and difficulty, in which he again reached Independence Bay. Scarcity of game threatened to destroy all, but by strenuous efforts they reached Bowdoin Bay, one dog living and the men reduced to most desperate straits. Peary's successive journeys extended northward on the coast of east Greenland more than 2° of latitude, and, carrying its longitude 15° to the west, tended to prove that the new land of Lockwood is of limited extent. Independence Bay probably connects with Nordenskjöld Inlet (Lockwood, 1882), and bounding Greenland, makes the land to the north separate, as advanced by Greely. The studies by Chamberlain (Peary Relief Expedition) of the Inglefield Gulf glaciers are important contributions.

The most important scientific polar explorations are those of the International Circumpolar stations, established through the efforts of Lieut. C. Weyprecht, Austrian navy, and in accordance with the recommendations of the International Polar Conferences of Hamburg, 1879, and of Berne, 1880. The following shows the supporting nations, commanders, localities and years of occupancy of the various stations: *Austria-Hungary*—Lieut. E. von Wohlgemuth, Mary Mussy Bay, 70° N., 8° 23′ W. (1882–83). *Denmark* — A. F. W. Paulsen, Godthaab, Greenland, 64° 11′ N., 51° 40′ W. (1882–83). *Denmark*—Lieut. A. P. Hovgaard, steamer *Dijmphna* (beset in Kara Sea), 71° N., 64° E. (1882–83). *Finland*—S. Lemström and E. Biese, Sodankyla, 67° 24′ N., 26° 36′ E. (1882–83). *Finland*—Kautokeino (substation), 69° N., 23′ E. (1882–83). *France*—Lieut. Courcelle-Seneuil, Orange Bay, Cape Horn, 55° 31′ S., 70° 21′ W. (1882–83). *Germany*—W. Giese, Kingawa Fiord, Cumberland Gulf, 66° 36′ N., 67° 19′ W. (1882–83). *Germany*—K. Schrader, Royal Bay, South Georgia, 54° 31′ S., 30° 1′ W. (1882–83). *Great Britain and Canada*—Capt. H. P. Dawson, Fort Rae, Great Slave Lake, 62° 39′ N., 115° 44′ W. (1882–83). *Holland*—M. Snellen, steamer *Varna* (beset in Kara Sea), 71° N., 64° E. (1882–83). *Norway*—A. S. Steen, Bossekop, 69° 56′ N., 23° E. (1882–83). *Russia*—Lieut. C. Andrejeff, Little Karmakul, Nova Zembla, 72° 23′ N., 52° 44′ E. (1882–83). *Russia*—Lieut. N. Jürgens, Sagastyr, Lena Delta, 73° 23′ N., 124° W. (1882–84). *Sweden*—N. Ekholm, Cape Thorsden, Spitzbergen, 78° 28′ N., 16° E. (1882–83). *United States*—Lieut. A. W. Greely, Fort Conger, Grinnell Land, 81° 44′ N., 64° 45′ W. (1881–83). *United States*—Lieut. P. H. Ray, Point Barrow, Alaska, 71° 16′ N., 158° 40′ W. (1881–83).

Physical observations and not geographic explorations were the main object and outcome of these expeditions. All surveyed adjacent regions, and in Nova Zembla Dr. Grinetsky crossed from Little Karmakuly to Kara Sea in 1883. Ray, at Point Barrow, sledged in the interior to the foot-hills of Meade Mountains, 69° 55′ N., 158° W., and discovered to the east of Dease Inlet Meade River, with a delta of five mouths. The most northern international station was at Lady Franklin Bay, 81° 44′ N., 64° 45′ W., in Discovery Harbor, Grinnell Land, Lieut. A. W. Greely commanding. Buildings were constructed, supplies for two years landed on Aug. 11, 1881, and the transport *Proteus* returned to Newfoundland. Dr. Pavy reached 82° 56′ N. on the frozen Arctic Ocean, when a gale April 23, 1882, disintegrated the main polar pack, from which he escaped with indispensable articles. Lieut. James B. Lockwood, after preliminary journeys, in temperatures 81° below freezing, started April 3, 1882, to explore northern Greenland. Reaching Cape Bryant with seven men from Cape Fulford, he ascertained that St. Andrew's and St. George's fiords united, and that western Greenland to the north of the 82d parallel was free from a permanent ice-cap. Striking northward across entirely unexplored regions, Lockwood, with dog-sledge and 25 days' rations, passed Cape Britannia and found land trending to the east-northeast. Despite extraordinary obstacles he reached, May 13, 1882, Lockwood Island, 83° 24′ N., 42° 45′ W., the highest latitude ever attained on any land. From a cliff 2,600 feet high the frozen sea was seen beyond 84° N., to within 350 miles of the North Pole, and to the northeast Cape Washington, the most northern known land, in 83° 35′ N., 38° W. The land which Lockwood discovered was snow-capped mountains, separated by entering fiords. De Long, Chipp, Nordenskjöld and Victoria inlets were immense fiords with no signs of heading, thus indicating the new land to be an archipelago. Foxes, hares, lemmings, ptarmigans and plants showed vegetation for extensive animal life. Extensive explorations of Grinnell Land were made by Greely in two journeys in 1882, during which he ascended Mt. Arthur, 4,500 feet, and discovered remarkable and unexpected physical conditions. An extensive glacial ice-cap covers North Grinnell Land between the Polar Sea and the newly-discovered Garfield Mountains; through breaks in this range, glaciers (one, Henrietta Nesmith, 5 miles wide, 175 feet high) feed Lake Hazen, 500 square miles in area, which drains to the sea through Ruggles River and Chandler fiord. A belt of country, about 150 miles long and 40 miles wide, was entirely snow-free in summer. Luxuriant vegetation affords pasturage for extensive herds of musk-oxen, foxes, hares, etc. In 1883 Greely's discoveries were supplemented by Lockwood and Brainard, who crossed Grinnell Land farther to the south, from Archer to Greely fiord. South Grinnell Land is covered by an enormous ice-cap, which extends unbroken between these two fiords, 80 miles, with a vertical ice-face measuring from 125 to 200 feet. At their farthest, 80° 48′ N., 78° 26′ W., from cliffs 2,200 feet high Greely fiord proved to be an arm of the western Polar Ocean. Its northern coast ends in Cape Brainard and the southern in Cape Lockwood, 60 miles distant, whence the land possibly trends south to the western extremity of Hayes Sound, in the vicinity of Schley Land. Greely and Lockwood discovered about 6,000 square miles of new land. Its topography and physical conditions satisfactorily explain the cause and manner of the transference, across Grinnell Land and around North

Greenland, to East Greenland of the fleeing musk-ox and pursuing Eskimo from the barren lands of North America and the Parry archipelago.

In addition to botanical, anthropological and zoölogical researches, physical observations were systematically pursued for two years. These observations have been the basis of co-tidal lines of the American Arctic Ocean; have disclosed a sidereal diurnal inequality of the tidal wave; have established a determination of gravity most important for ascertaining the figure of the earth; and have enabled scientists to calculate the secular magnetic variations of the Smith Sound region.

The mismanaged relief ships of 1882 and 1883 failing to reach Discovery Bay, Greely with reduced supplies was obliged to escape southward by boats. Starting August 10, 1883, he succeeded in a dangerous and desperate ice-journey of 400 miles in reaching Cape Hawk in 16 days. Frozen in while crossing to Bache Island, the party experienced the horrors of an ice-drift, but after 34 days effected a landing with all their records and effects, between Capes Sabine and Isabella. Scouring the country and learning of the loss of the relief ship *Proteus* they were obliged to winter at Cape Sabine, whence Garlington's retreating party had carried all available supplies, so that the party found themselves at the beginning of an Arctic winter with 40 days' rations to tide over 8 months. Game was assiduously pursued, but the region was so barren that the food-supply was inadequate and the majority of the party died of starvation. Greely and six remaining men were rescued at the point of death June 22, 1884, by Capt. W. S. Schley and Commander W. H. Emory, who reached them in the United States ships *Thetis* and *Bear*. Scientific observations were kept up to the last, and geographical explorations showed that Cape Sabine is an (B. Pim) island, and Hayes Sound extends westward to Schley Land.

In 1881 the English explorer Leigh Smith visited Franz Josef Archipelago a second time. Sighting Cape Ludlow, June 28, he was driven by unfavorable ice to Northbrook island, where his ship *Eira* was crushed by the ice and sank. By extraordinary energy Smith saved his boats and sufficient supplies, supplemented by hunting, to last through the winter. Leaving Northbrook island the middle of June, 1882, it was August before they reached the open sea. Following the west coast of Nova Zembla they reached, unaided, Matthew Strait, where, on August 3, 1882, they met the Dutch surveying schooner *Willem Barents*. This schooner under various Dutch officers has spent eight consecutive summers, 1878–86, surveying hydrographically Barents Sea almost to the southern shores of Franz Josef Land. An expedition under the English explorer E. F. Jackson is still (April, 1896) engaged in exploring Franz Josef Archipelago. Sailing in the *Windward*, Jackson landed Sept. 7, 1894, near Cape Flora, where he erected portable houses. Unexpectedly frozen in, his ship wintered with unfortunate results, and in 1895, after a voyage of 65 days through an ice-field 300 miles wide, reached Vardö with 12 of her crew scurvy-stricken and 2 dead. She brought news that having laid out depots as far as 81° 20′ N., about 50° E., Jackson started in May, 1895, on his main journey of northern discovery. It appears from the earlier journal of Jackson that Franz Josef Land, to the westward of Austria Sound, consists of small detached islands instead of extensive land-masses, there being only a frozen ocean in sight from 80° 36′ N., 50° 5′ E.

The explorations of the past ten years appear to indicate that Spitzbergen and Franz Josef archipelagoes are united by a series of small islands along the 80th parallel. In 1884 Captain Kjeldsen and Sorrenson discovered independently a small (White) island. In 1887 Capt. V. H. Johannesen discovered another island, in lat. 80° 10′ N., long. 30° 3′ E., several degrees to the east of Northeast Land. This high mountainous land is not more than one hundred nautical miles distant from Cape Lofley, the westerly known point of Franz Josef Land. In 1884 Captains Johannesen, Hemming and Andreassen visited King Charles Land to the east of Spitzbergen. Their observations determined that this land had been charted by the Norwegian whalers of 1872 about 8° of longitude too far to the east. It also appeared that there are at least three islands instead of one, this coinciding with Altman's opinion of 1872. These islands were fully visited in 1889 no less than four times by Dr. W. Kukenthal, who fully explored their fauna and flora.

A Russian scientist, K. Nossilif, passed three winters, from 1888 to 1891, on the southern island of Nova Zembla. A very considerable portion of the island was surveyed, whereby iron, copper, gold and coal were discovered, the last in generous quantities. Important botanical, mineral and geological collections were made and many physical observations taken. The coast-line and adjacent sea were surveyed and three new islands discovered, one of them (Possiet) being quite large. In 1895 Dr. Chernyskef examined geologically Nova Zembla along the west coast, from Matoschin Schar to Nameless Bay, and also the interior in his journey from Karmakuly across to Kara Sea.

Between 1885 and 1894 the new Siberian Islands were thoroughly explored by expeditions under the auspices of the Imperial Russian Geographical Society. In 1885 Dr. A. Bunge and Baron E. von Toll visited Jana Land, Siberia. Their most important work was the discovery, in April, 1886, at Bo-Urjak, 70° 3′ N. on Dodomo River, of a mammoth skeleton covered with moss, its bones intermixed with birds' feathers, grass yet green, and other surroundings which indicated a not very remote period. That summer, Toll and Bunge extended their journey to the new Siberian group with eight men. Bunge made Great Liakoff Island the base of his operations. Toll established his headquarters at Kotelnoi, visited Nova Sibir in 23 days, and later explored other islands. In a journey of 40 days he skirted the entire coast of Kotelnoi, and in August from its northwest hills saw the reputed Sannikof Land of 1811. Fortunately the weather was clear, and there were distinctly visible four lofty mountain-peaks which dotted the horizon from 14° to 18° west of north. Toll was able to note that they were

united by a foreland of unbroken continuity, thus indicating a somewhat extensive land. Meanwhile, Bunge was fossil-hunting on Great Liakoff, where he obtained great quantities of fossiliferous remains of the mammoth, rhinoceros, deer, horse, musk-ox, and two new species of the ox family. Toll states that the base of the low-lying parts of Great Liakoff is solid ice, covered by various strata of mud and clay, in which alone the remains of the mammoth and other extinct animals are found. He attributes the extirpation of the mammoth, rhinoceros and other animals constituting the rich fauna of the glacial period to the sinking of the coast, which gradually restricted the land area that furnished nutrition until the animals perished at the very edge of the ice-masses. Baron von Toll in 1893 made a fruitless effort to discover a well-preserved mammoth reported as existing in the Jana region. Scientifically the journey was fruitful in physical observations and rich collections, which were made under such conditions as to fully convince Toll that in the mammoth period the northern limit of timber extended to 74° N., nearly two hundred miles northward of its present limit. During his journey Toll, with Lieutenant Shileiko, laid down two provision depots on the west coast of Kotelnoi, in 75° 37′ N., trusting that they might prove useful for Nansen should he be obliged to retreat to the Siberian coast. Returning, Toll took a direct route from Sviatoi Noss to Dudinka on the Lena, and crossed with reindeer the *tundras*, which were thought to be impassable.

Dr. F. Boas, an American, in 1883–84 explored Baffin Land between Labrador and Lancaster Sound, clearing up the geography of this region and adding most important ethnographic data regarding the Central Eskimo.

The Wellman expedition (1894) ended in the sinking of the *Ragnvald Jarl*, at Walden Island, north of Spitzbergen. Of Nansen's effort to drift across the North Pole in the *Fram*, hoping to emerge between Iceland and Spitzbergen, it was learned that he had passed into the ice of Kara Sea in 1893. On the 13th of August, 1896, he reached Vardö, Norway, having been picked up by the relief steamer *Windward* at Franz Josef Land, where he had passed the previous winter. In March, 1895, he left the *Fram*, which, drifting subsequently to the north of Spitzbergen, safely reached Norway at 86° 14′ N. latitude. See also NANSEN and JACKSON, in these Supplements; and POLAR REGIONS, Vol. XIX, pp. 327–343.

A. W. GREELY.

POLAR EXPLORATION, RECENT. Human ingenuity and endurance are still being put forth, at times with pathetic persistence, to reach the North Pole. In the autumn of 1900 word was received that the Duke of Abruzzi's expedition, which sailed from Christiania, on the *Stella Polare*, June 12, 1899, and was sighted in the British Channel (lat. 80° 20′), on Aug. 9th of that year by the returning Wellman party, had "topped" the record, by reaching the nearest point to the Pole hitherto known to be attained. The point gained was 86° 33′, or 19 geographical miles nearer the goal than was reached by Nansen in his phenomenal voyage in 1896. This surpassing of Nansen's record, which was 86° 14′, was achieved by what is called as the dash-for-the-Pole method, and not as the result of a labored and elaborately pre-arranged scientific expedition, such as Nansen's was. It will nevertheless, no doubt, have its stimulating and inciting effect on other explorers and navigators, and may be surpassed by the achievement of Peary, whose early return is now looked for. The practical results of the Abruzzi expedition were not much. As we write (Sept. 1900), no news has as yet been heard of the missing balloonist, S. A Andrée, and his two companions, who in July, 1897, left Dane's Island (about 80° N.) in a balloon, with the expectation of drifting across the Pole. The only news since heard of the voyageurs was that obtained a day or two after setting out by pigeon post, though an anchor and buoy were discovered, which belonged to Andrée, Sept. 11, 1899, at a point north-east of Spitzbergen. Other recent Arctic expeditions include that of Prof. Baldwin, equipped through the munificence of Mr. W. Ziegler, of New York, and a second one, organized by the Duke of Abruzzi, which set out in the early summer of 1901 for Franz Joseph Land to search for lost members of the Duke's expedition of 1889–1900. The Baldwin expedition of 1901 set out from Tromsö July 16th, reached Franz Joseph Land a month later and pushed on for the north under advantageous conditions. Time must however elapse ere news of either expedition can be heard.

G. M. A.

POLARIZATION. See AURORA, Vol. III, p. 81; LIGHT, Vol. XIV, p. 615; and WAVE THEORY, Vol. XXIV, pp. 470–473.

POLE, WILLIAM, an English actor, better known by his stage-name, "William Poel"; born in July, 1852. He made his first appearance on the stage at the Royal Theatre, Bristol, 1876. He made a special study of Shakespeare, and in 1881, with Dr. Furnivall, produced *Hamlet* with Elizabethan costumes, and without scenery, in St. George's Hall, London.

POLE, WILLIAM, an English civil engineer; born in Birmingham in 1814. In 1844 he was professor of civil-engineering in Elphinstone College, Bombay; 1859–67 was professor in University College, London; in 1871 was appointed consulting-engineer for the imperial railroads of Japan, and upon his retirement from the post in 1883 was honored by the Mikado with the decoration of the third degree of the Imperial Order of the Rising Sun. He was made a fellow of the royal societies of Edinburgh and London. Among his works are *The Life of Sir William Fairbairn; The Life of Sir William Siemens; The Story of Mozart's Requiem;* and *The Philosophy of Music.* He died in London, Dec. 30, 1900.

POLISHING MACHINERY. Devices for polishing necessarily vary greatly with the nature of the material treated. For stone and marble a felt-covered disk of wood is commonly used, being mounted on a swinging framework designed to give the required pressure and to allow rotation of the disk by means of connecting pulleys. Some form of powder—as chalk or whit-

ing, or tripoli, or pumice—is ordinarily used to facilitate the work. For leather-polishing, a machine carrying a hardwood slicker is used. For metal-work, emery-wheels of varying degrees of fineness are employed. Coarse, common work is cleaned and polished in a polishing-cask or tumbling-barrel, where it is subjected to friction, often with the introduction of some polishing-powder. Lapidaries use a specially smooth wheel of metal, wood, etc., according to the nature of the work. Gunpowder is tumbled about in a barrel with graphite to glaze it. Dentists use a small disk, rotated by a drill-stock or the like, for polishing teeth or fillings. Bookbinders make use of an iron tool for polishing book-covers by pressure.

POLISH LANGUAGE. See SLAVS, Vol. XXII, p. 160.

POLISH LITERATURE. See POLAND, Vol. XIX, pp. 310–317.

POLITICAL SCIENCE. See PHILOSOPHY, Vol. XVIII, p. 809.

POLITY, Ecclesiastical. See CHRISTIANITY, Vol. V, pp. 607, 608; and ECCLESIASTICAL LAW, Vol. VII, p. 543.

POLIZIANO. See POLITIAN, Vol. XIX, pp. 358, 359.

POLK, LEONIDAS, bishop and soldier; born in Raleigh, N. C., April 10, 1806; was educated at the University of North Carolina and West Point Military Academy, but soon gave up the army for the ministry, and was ordained in the Protestant Episcopal Church in 1830. After holding several positions as rector, he was made missionary bishop of the Southwest in 1838 and bishop of Louisiana in 1841. On the outbreak of the Civil War he took an active part with the South, was made major-general in 1861, and as such commanded at the battle of Belmont, Nov. 7, 1861; was present at the battle of Shiloh; commanded at Perryville; was made lieutenant-general in October, 1862; and was killed near Marietta, Ga., June 14, 1864. G.J.H.

POLLAIUOLO, ANTONIO (1443–96), a Florentine painter. See SCHOOLS OF PAINTING, Vol. XXI, p. 452.

POLLARD, EDWARD ALBERT, an American journalist and author; born in Nelson County, Va., Feb. 27, 1828. He was graduated from the University of Virginia in 1849, studied law at William and Mary College, and in 1854 went to California. He travelled in South America and Europe and upon his return began the study of theology. In 1861 he became editor of the Richmond *Examiner*. While endeavoring to run the blockade in 1865 on his way to England he was captured and imprisoned in Fort Monroe for eight months, when he was released by General Butler. He was an ardent supporter of the Confederacy, but took a dislike to Jefferson Davis and was his bitter opponent throughout the war. In 1867 he established the *Southern Opinion* a radical journal which he edited until 1869, when he retired to devote himself to literary work. He published *Black Diamonds* (1859); *Southern History of the War* (1862); *The Lost Cause* (1866); *Lee and His Lieutenants* (1867); *The Life of Jefferson Davis* (1869); *The Virginia Tourist* (1870). He died in Lynchburg, Va., Dec. 12, 1872. W.M.C.

POLLARD, MARIE ANTOINETTE GRANIER-DOWELL; an American lecturer; wife of E. A. Pollard; born in Rockbridge County, Va.; married James R. Dowell in 1852, but at the outbreak of the Civil War left him on account of political differences. She went to Richmond where she met Pollard, whom she married in 1862. After the death of Pollard in 1872 she removed to California, where for a time she was a public speaker, lecturing on temperance and political questions. W.M.C.

POLLARD, PERCIVAL, an American author; born in Pomerania of English-German parentage, June, 1869. He was educated at Eastbourne College, Sussex, England; removed to the United States in 1885 and began a journalistic career on the St. Joseph *News*. Since 1891 he has engaged in literary work and has written *The Cape of Storms* (1892); *Miniature Dreams* (1893); *The Kiss That Killed* (1898); *Dreams of To-Day* (1900). W.M.C.

POLLEN. See BOTANY, Vol. IV, pp. 125, 126.

POLLEN, JOHN HUNGERFORD, an English artist; born in 1820; was educated at Oxford, and was elected to a fellowship of Merton, where he painted the college chapel. He studied painting in Rome; was appointed professor of fine arts in the Catholic University of Dublin by Cardinal Newman; built and painted the church in Stephen's Green. He contributed to periodicals on subjects connected with the fine arts, and was Cantor lecturer of the Society of Arts in 1885. Mr. Pollen was corresponding member of the Royal Academy of Madrid, the Archæological Society of Belgium and other learned bodies; and published *Ancient and Modern Furniture and Woodwork;* the *Trajan Column;* and contributed the articles on, CARVING, FILIGREE and FURNITURE in this ENCYCLOPÆDIA.

POLLOCK, SIR CHARLES EDWARD, lawyer; born Oct. 21, 1823; son of Sir Frederick; educated at St. Paul's School. He acted as secretary for his father while attorney-general, subsequently studied law, and was admitted to the bar in 1847. In 1866 he was created a queen's counsel; was appointed a baron of the exchequer in 1873, and was soon afterward knighted. He published several legal text-books, including *Treatise on the Law of Merchant Shipping*, and *Law and Practice of the County Courts*. He died in 1897. G.J.H.

POLLOCK, SIR FREDERICK, lawyer; born Dec. 10, 1845; grandson of the first baronet; was educated at Eton and Cambridge; called to the bar at Lincoln's Inn in 1871; and was examiner in law at Cambridge in 1879–81. He was professor of jurisprudence at University College in 1882–83, and at Oxford in 1883 and later, and was professor of common law in the Inns of Court in 1884–90. He became editor of the *Law*

Reports in 1895. He was the author of *Spinoza* (1880); *Oxford Lectures* (1891), etc. G.J.H.

POLLOCK, Sir Frederick, lawyer; born in England, in 1783; son of Sir David Pollock, chief justice of Bombay. He was educated at Cambridge University, graduating in 1806, was admitted to the bar in 1807, became king's counsel in 1827, and in 1831 was elected as a Tory member of Parliament. He was appointed attorney-general in 1843, and chief baron of the exchequer in 1844; was knighted in 1834 and made a baronet in 1866. He died in 1870. G.J.H.

POLLOCK, Walter Herries, author; born in London, Feb. 21, 1850; brother of the second Sir Frederick; was educated at Eton and Trinity; and called to the bar in 1874. He was editor of the *Saturday Review* in 1884–94. He has delivered lectures at the Royal Institution on historical and literary subjects, and written *Lectures on French Poets, Old and New; The Picture's Secret*, a novel, etc. G.J.H.

POLO, a village of Ogle County, central northern Illinois, 13 miles N. of Dixon, on the Illinois Central and the Chicago, Burlington and Northern railroads. It manufactures harvesters and buggies, and is an important trade center, especially for cattle and hogs. It has a public library, national banks and papers. Population 1890, 1,728, 1900, 1,869.

POLYANDRY. See Family, Vol. IX, pp. 18, 19.

POLYANTHUS. See Horticulture, Vol. XII, p. 267.

POLYCENTRIDÆ. See Ichthyology, Vol. XII, p. 727.

POLYCHÆTÆ. See Annelida, Vol. II, pp. 58–61.

POLYEMBRYONY, in botany, strictly refers to the production of more than one embryo by a single fertilized sexual cell. Ordinarily, however, it is applied to all cases in which more than one embryo is found in a seed,—a fact repeatedly observed in orange seeds.

POLYGAMY. See Mormons, Vol. XVI, pp. 853, 854.

POLYGON. See Geometry, Vol. X, pp. 339, 340.

POLYGONUM, a large genus of plants, chiefly weeds, distributed everywhere. The smartweeds and knotweeds are among the common species, while the more showy ones, such as *P. orientale*, or prince's feathers, are cultivated for ornament. The East Indian "giant clover" (*P. Sachalinense*) has been introduced into the United States from Russia as a forage plant. It grows very luxuriantly in regions formerly thought unfit for grazing purposes, producing an extraordinary amount of foliage, attaining a height of 8 to 12 feet.

POLYGORDIUS. See Worm, Vol. XXIV, p. 719.

POLYHEDRA. See Mensuration, Vol. XVI, p. 29.

POLYHYMNIA. See Muses, Vol. XVII, 81.

POLYMERISM. See Chemistry, Vol. V, 478.

POLYMORPHISM, in botany, refers to the fundamental fact in the morphology of plants that a plant assumes at least two different forms during its life-history, giving rise to what is known as Alternation of Generations; q.v., in these Supplements.

POLYNEMIDÆ. See Ichthyology, Vol. XII, p. 727.

POLYNICES, the son of Œdipus by his own mother, Jocasta, and one of the heroes in the Greek legend of the *Seven Against Thebes*. See Adrastus, Vol. I, p. 150.

POLYPHASE CURRENTS. See Electricity, § 88, in these Supplements.

POLYPHEMUS, one of the mythical Cyclopes of Sicily, the son of Poseidon (Neptune) and the nymph Thoosa. He is represented as a gigantic ogre, having but one eye, and that in the middle of his head, who was without fear of gods or men. He lived in a cave near Mount Etna and kept sheep. He fell in love with the nymph Galatea, and when she chose Acis in preference to him, killed his rival by crushing him under a great rock. Ulysses was shipwrecked on the Sicilian coast near the cave of Polyphemus, and was captured and imprisoned by the monster, who devoured some of his men. Ulysses, however, put out the giant's eye while he was asleep, and escaped, with the remnant of his band, by clinging to the wool on the sheep as they left the cave, when Polyphemus let them out to pasture.

POLYPHONY. See Music, Vol. XVII, p. 93.

POLYPLACOPHORA. See Mollusca, Vol. XVI, p. 664.

POLYPODIACEÆ. See Ferns, Vol. IX, p. 92.

POLYTHEISM. See Religions, Vol. XX, p. 380.

POMERANUS. See Bugenhagen, Vol. IV, p. 399.

POMEROY, a city and the capital of Meigs County, southeastern Ohio, on the Ohio River, 20 miles above Gallipolis, and on the Columbus, Hocking Valley and Toledo railroad. It contains numerous salt-furnaces and coal-mines, and has rolling and rail-mills, flour, saw, planing and woolen-mills, machine and engine works, and other industries. Pop. 1890, 4,727; 1900, 4,639.

POMEROY, Marcus Mills, commonly called Brick Pomeroy, an American journalist; born in Elmira, New York, Dec. 25, 1833; died in Brooklyn, New York, May 30, 1896. He gained the rudiments of an education in the common schools, and at 17 was apprenticed to the publisher of the Corning (New York) *Journal;* later conducted a paper of his own in Corning, and afterward in Athens, Pennsylvania; from 1857 to 1864 he lived in Wisconsin and published the La Crosse *Democrat*, which came to have a very large circulation; moved to New York in 1868 and founded *Brick Pomeroy's Democrat*, which gained an immense circulation because of its radicalism and sensationalism. He suffered financial loss, and for a time lived in Chicago, but returned to New York in 1875, resumed the editing of his paper and became one of the chief supporters of

"greenbackism." His health soon failed him, and he went to Colorado and there engaged in mining and railroading, but still kept up his connection with several New York radical papers. He published several books, principally on economic subjects; among them, *Sense* (1868); *Nonsense* (1868); *Gold Dust* (1872); *Brick Dust* (1872); *Home Harmonies* (1874); and *Perpetual Money* (1878).

POMEROY, JOHN NORTON, an American writer on jurisprudence; born in Rochester, N. Y., April 11, 1828. He was graduated from Hamilton College in 1848 and was admitted to the bar in 1850. He was an instructor in the University of the City of New York in 1864 and the following year resumed his law practice. In 1878 he removed to the Pacific Coast and became professor of jurisprudence in the University of California. He edited Sedgewick's *Constitutional Law* (1874); Archbold's *Criminal Law* (1876), and the *West Coast Reporter* (1884). He wrote *Riparian Rights* (1871); *Remedies and Remedial Rights* (1872); *Municipal Law* (1874); *Constitutional Law of the United States* (1876); *Specific Performance of Contract* (1878); *Equity Jurisprudence* (1879). He died in Oakland, Cal., Feb. 16, 1885. W.M.C.

POMEROY, SETH, military officer; born in Northampton, Mass., May 20, 1706. He entered the colonial military service, in which he continued for many years, rising in rank to colonel. In February, 1775, he was appointed a brigadier-general of militia. He fought at Bunker Hill as a volunteer, and shortly afterward was made the senior brigadier-general of the Continental army. Disputes arising, he resigned from the army, but in 1776 raised a volunteer force and marched to Washington's aid. On the way he fell sick, and died at Peekskill, N. Y., Feb. 19, 1777. G.J.H.

POMO INDIANS. See INDIANS, Vol. XII, p. 866.

POMOLOGY. See *Fruits*, under HORTICULTURE, Vol. XII, pp. 278–289.

POMONA. See ORKNEY ISLANDS, Vol. XVII, pp. 870–874.

POMONA, California, a city of San José township, Los Angeles County, on the Santa Fé, and on the Southern Pacific railroads, 32 miles east of Los Angeles with fruit culture and canning, planing-mills, and machine works. Population, 1890, 3,634; 1900, 5,526. C.L.S.

POMPANO, a name given to several different fishes. The name properly refers to the genus *Trachynotus*. *T. carolinus* occurs on the Atlantic coast, and large numbers are captured on the Florida coast. On the California coast and in Europe the name is applied to species of *Stromateus*. Several different fishes in the Gulf of Mexico have also have been locally called pompanoes.

POMPEY'S PILLAR. See ALEXANDRIA, Vol. I, p. 437.

PONCA, a village and the capital of Dixon County, northeastern Nebraska, 18 miles W. of Sioux City, Iowa, on the Missouri River, and on the Chicago, St. Paul, Minneapolis and Omaha railroad. It is in a lumbering and wheat-raising region. Population 1890, 1,009; 1900, 1,043.

PONCA INDIANS. See INDIANS, Vol. XII, p. 871.

PONCE, a town and district. See PORTO RICO, Vol. XIX, p. 547.

PONCE DE LEON, JUAN, a Spanish discoverer; born in Leon, Spain, in 1460. He distinguished himself in campaigns against the Moors, and, accompanying Columbus on his second expedition in 1493, became commander of the eastern province of Hispaniola. In 1509 he conquered the island of Porto Rico, but was removed from its governorship on account of his severity. Learning of the reputed existence of a fountain which could restore youth and beauty, he sailed from Porto Rico, March 3, 1512, for the Bahamas. His search for the fountain was unavailing, however, but on April 8 he landed near the present site of St. Augustine, Fla., and took possession of the country for the king of Spain. In 1513 he returned to Spain, and the following year commanded an unsuccessful expedition against the Caribbees. In 1521 he sailed from Porto Rico to assume the governorship of Florida, but was mortally wounded in a skirmish and died in Cuba, in 1521. E.E.T.

PONCHIELLI, AMILCARE, an Italian opera composer; born in Paderno Fasolaro, Cremona, Aug. 31, 1834; studied at the Conservatory of Milan in 1843–54; in 1856 his first opera, *I Promessi Sposi*, was produced at Cremona; later he wrote *La Savojarda* (1861); *Roderico* (1864); and *La Stella del Monte* (1867). In 1872, his first work, rewritten for the purpose, was produced at La Scala, Milan, and won him immediate renown. His later works are *Le Due Gemelle*, a ballet (1873); *Il Parlatore Eterno* (1873); *I Lituani* (1874); *Gioconda* (1876); *Marion Delorme* (1885), and other operas, besides a cantata performed at the reception of the remains of Donizetti and Simone Mayr at Bergamo in 1875. He died in Milan, Jan. 16, 1886. At the time of his death he was esteemed next to Verdi by the Italians as a composer of opera.

PONDWEED, the common name of species of *Potamogeton*, a genus of plants having perfect flowers in a spike. The perianth has four scales, four opposite sessile anthers, four pistils which become four small nuts, and a curved embryo. The species abound chiefly in the rivers, lakes and ditches of the United States and Europe. They often present a beautiful appearance in clear streams and ponds.

PONS VAROLII. See ANATOMY, Vol. I, p. 765.

PONTA DELGADA, a town. See AZORES, Vol. III, p. 147; and DELGADA. Pop. (1900), 17,675.

PONT-À-MOUSSON, a town in the department of Meurthe-et-Moselle, northwestern France, on the river Moselle and 14 miles N. of Nancy. It has blast-furnaces, iron and locksmiths' shops, and manufactures plush and velvet; was the seat of the University of Lorraine from 1572 to 1768, and was also the birthplace of Margaret of Anjou,

wife of Henry VI of England, and Marshal Duroc, the friend and favorite of Napoleon I. Population, 9,904.

PONTCHARTRAIN, Lake, a body of water in southeastern Louisiana, five miles W. of the Mississippi, at New Orleans. It is 40 miles long and 25 wide, and connects with New Orleans by two canals. It communicates with Mississippi Sound and Lake Borgne by the passes of Chef Menteur and Rigolets. On its shores are many summer resorts, its northern bank being high and healthful. Lumber, firewood and brick, manufactured in the neighborhood, are extensively transported through the lake.

PONT DU GARD. See Aqueduct, Vol. II, p. 192, plate.

PONTIAC, a city and the capital of Livingston County, northeastern central Illinois, 35 miles N.W. of Bloomington, on the Vermilion River, and on the Chicago and Alton, the Illinois Central and the Wabash railroads. It is the seat of a state reform school, and is engaged in milling, mining, iron-casting, shoe and straw paper manufacturing, and general trade. Population 1890, 2,784; 1900, 4,266.

PONTIAC, a city and the capital of Oakland County, southern Michigan, on Clinton River, surrounded by many small and beautiful lakes, 26 miles by rail N.W. of Detroit, on Pontiac, Oxford and Northern, the Detroit, Grand Haven and Milwaukee and the Grand Trunk railroads. Oak, ash, elm and beech forests lie about the city; the soil is fertile; corn, oats, wool, etc., are produced. It contains the State Reform School and the State Insane Asylum, which cost nearly five hundred thousand dollars, and has flour and planing mills, foundries and brick-yards. Population 1890, 6,200; 1900, 9,769.

PONTIAC, a famous chief of the Ottawa Indians; was born about 1720, the son of either a Miami or a Nipissing father and an Ojibway mother. A coalition of tribes made him the chieftain of the Ottawas and their allies. He led the Ottawas at Braddock's defeat, in 1755, but in 1760 became a friend of the English. In 1762 he organized a vast conspiracy, for a general uprising against the English. Detroit was besieged, and a number of forts and posts in the northwest were captured and their inmates massacred. His bloody career was checked in 1763, when many of the tribes deserted him, but he persisted in hostilities until July, 1765, when Sir William Johnson brought him to terms. Peace was made, and was faithfully kept until 1769, when Pontiac was murdered by a Kaskaskia Indian who had been hired by a British trader to do the deed. W.F.J.

PONTINE MARSHES. See Campagna, Vol. IV, p. 664.

PONTUS, Euxinus, the ancient name for the Black Sea; q.v., Vol. III, 690–694.

POOL. (For a general account and history, see Billiards, Vol. III, p. 585.) There are an almost endless number of games to be classed within this category, but the principal ones are pyramid, 15-ball and continuous pool. In 15-ball pool the balls are numbered from 1 to 15, and it is the aim of the players, when two are engaged, to secure an aggregate of 61. The sum total of all the numbers on the 15 balls amounts to 120, and the player first obtaining the number (61) which is more than half of the total wins the game. The game of American pyramid pool as played in championship matches differs from 15-ball pool quite materially. The rules governing pyramid pool recognize the numbers on the balls solely as a means of identification when the player called his shot. Instead of a player being required to hole balls bearing numbers sufficient to give him a certain total of points, it was simply necessary for him to pocket a majority of balls, regardless of their numbers, in order to win. Thus, if two men were playing pyramid pool, the man who succeeded in first pocketing 8 out of the 15 balls comprising the pyramid would be declared the winner. This style has, however, been amended by what is known as continuous pool, which is now the prevailing system of play in all professional contests for championship honors. The rules of continuous pool provide that the balls shall be numbered from 1 to 15, but the scoring of the game is continued until all the balls in each frame have been pocketed. The game may consist of any number of balls, or points up, which may be agreed upon. Each ball pocketed scores one point for the player, and the game is usually scored upon a string of buttons over the table, as in regular billiards. Penalties are paid through deducting points from the offending player's score, or string of buttons, instead of forfeiting a ball to the table, as in regular pyramid pool. There have been several interpolations in the rules governing continuous pool during the past few years. In a match for the championship of the world, between Alfred de Oro and William H. Clearwater, at Pittsburg, Pennsylvania, May 7, 8, and 9, 1896, which was won by De Oro, the existing rules provided that a player must call a ball on the break or opening shot at the pyramid, and a ball that was holed in any hole except the one named was spotted. The pockets of the table (which is the regulation 5 by 10 feet) are now numbered from 1 to 6, and the player, when about to shoot, designates both the ball and the pocket, and the ball must be holed as specified, or the player does not count.

The game of pin-pool is also popular, and occupies a prominent position in the history of pool-playing in America. There have been many notable encounters at this game, and it still ranks very high among billiard and pool players all over the country. It is played with two white balls and one red, together with five small wooden pins, which are set up in the middle of the table, diamond-fashion, each pin having a value (from 1 to 5) to accord with the position it occupies. The one nearest the string-line is No. 1, that to the right of it is No. 2, to the left is No. 3, the pin farthest from the string-line is No. 4, and

the central pin is No. 5. The object of the player is to knock down (after striking an object-ball with his cue-ball) as many pins as will count 31, when the number on a small ball, which he received before the game starts, is added to their aggregate. The numbers on these small balls are known only to the individual players who possess them, and are not disclosed to opposing players. Whoever first gets 31 points wins the pool. See also BILLIARDS, in these Supplements.

BENJ. A. MACDONALD.

POOL, MARIA LOUISE, an American authoress; born in Rockland, Massachusetts, Aug. 20, 1845; the daughter of Elias Pool, a manufacturer of that place, and of stanch Puritan stock. She received her education in the East Abington schools, with the view of becoming a teacher, but she gave up this career after one year. She spent several seasons in the South and in the Carolina mountains, but it is in her own New England that she found her truest suggestions and inspirations. After 1885 she began to write sketches for the New York journals. Her *Vacation in a Buggy* (1887) gives her ideal of a vacation—a companion (human), a dog, a Texan pony, and a long day amid country byways. She also wrote *Tenting at Stony Beach* (1888); *Rowney in Boston* (1892); *Mrs. Keats Bradford* (1892); *Dally* (1893); *Katherine North* (1893); *The Two Salomes* (1893); *Out of Step* (1894); *Against Human Nature* (1895). Died in Rockland, Mass., May 19, 1898.

POOLE, JOHN, an English humorist; born in 1792. He wrote a number of sketches and farces which were full of a racy humor, resembling a little that of Sterne. Among the best known are *Paul Pry; Comic Sketch Book; Little Pedlington and the Pedlingtonians*, and *Christmas Festivities*. He died Feb. 5, 1879.

POOLE, REGINALD LANE, an English historian, son of R. S. Poole; born in London in 1856; was educated at Balliol College, Oxford, graduating in 1878. He was chosen to fill the chair of modern history at Jesus College in 1886. He published *History of the Huguenots of the Dispersion at the Recall of the Edict of Nantes* (1880); *Sebastian Bach*, in the Great Musician Series (1882); *History of Mediæval Thought in the Departments of Theology and Ecclesiastical Politics* (1884); and translated Land's *Principles of Hebrew Grammar* (1876). He contributed the article on WYCLIFFE to this ENCYCLOPÆDIA.

POOLE, REGINALD STUART, Egyptologist; born in London, England, Feb. 27, 1832; was educated in Cairo, Egypt; and began early to study Egyptian antiquities, publishing the results of his studies while quite young and being admitted in 1852 as an assistant in the department of antiquities of the British Museum. He became keeper of the department of coins in 1870, lectured and wrote frequently on this subject and on Egyptology, and contributed many articles to the *Dictionary of the Bible* and the ENCYCLOPÆDIA BRITANNICA. In 1882 he joined Amelia B. Edwards in founding the Egypt Exploration Fund, to which for twelve years he devoted most of his time and energy. He also, with Mr. Legros, founded the Society of English Medalists. He retired in 1893, and died at West Kensington, Feb. 8, 1895. G.J.H.

POOLE, STANLEY LANE. See LANE-POOLE, STANLEY, in these Supplements.

POOLE, WILLIAM FREDERICK, librarian; born in Salem, Mass., Dec. 24, 1821; was graduated at Yale College in 1849. While at college he became librarian of his college society, and began the work of indexing magazines and reviews for which he was afterward famous. In 1851 he was made assistant librarian of the Boston Athenæum and in 1852 librarian of the Boston Mercantile Library, returning to the Athenæum in 1856. He took charge of the public library of Cincinnati in 1869, of that of Chicago in 1873, and of the Newberry Library of Reference at Chicago in 1887. A second edition of *Poole's Index* was brought out in 1853, in which nearly 1,500 volumes were indexed; and in 1882 the third, indexing 6,205 volumes. Other editions have since appeared. He died at Evanston, Ill., March 1, 1894. G.J.H.

WILLIAM F. POOLE.

POOLS AND POOLING. See RAILROAD, in these Supplements.

POORE, BENJAMIN PERLEY, an American journalist and historian; born in Indian Hill, Newburyport, Mass., Nov. 2, 1820. He learned the printing trade as a youth and edited various provincial newspapers until 1840 when he went to Belgium as attaché of the American legation in Brussels. While in Europe he collected valuable historical data from the French archives for the state of Massachusetts and was a staff correspondent for the Boston *Atlas*. In 1854, upon his return to the United States, he went to Washington as Congressional correspondent for the Boston *Journal* and other newspapers, and later was made secretary of the American Agricultural Society. In 1852 a prize of $10,000 was offered by the state of Massachusetts for the best growth of seedling timber, and Poore won the premium by planting a forest on the family estate at Indian Hill. He served for several years in the Civil War, being commissioned major of volunteers. His writings include: *Life of Zachary Taylor* (1848); *Rise and Fall of Louis Philippe* (1849); *Conspiracy Trial for the Murder of Lincoln* (1865); *Congressional Directory* (1867); *Federal and State Charters* (1877); *Reminiscences of Sixty Years* (1886). He died in Washington, D. C., May 30, 1887. W.M.C.

POOR-LAWS. "Every person who is old, lame, blind, sick, decrepit, impotent, or in any other way disabled or enfeebled so as to be unable by his work to maintain himself, shall be

maintained by the county or town in which he may be." This was essentially the provision of the English poor-law adopted in the time of Elizabeth, in the hope of thus putting an end to the beggary which flogging and drowning and hanging and burning were not able to diminish, and this is essentially the basis of our poor-law system in the different states. Failing to banish the beggar by punishment, our ancestors went to the other extreme of feeding the beggar, of providing a shelter for him, and punishing those who would not pay for his support. This was the method of dealing with beggary which the colonies adopted from the mother country, and the principle which this method implied has found expression in the "poorhouse," fashioned after the English workhouse.

In early times the poorhouse was the common receptacle for all the unfortunate and indolent, from the fatherless infant to the vicious and idle beggar. The insane, both acute and chronic; the idiotic and feeble-minded; the deaf and dumb; the blind; the sick, of whatever disease; the unfortunate but respectable poor, the tramp, the dissolute—all classes of dependents and defectives, and even delinquents, were housed, and often without classification, in this one house of hopelessness and despair; for there could be little hope of physical recovery, or of the restoration of manhood, in such a place. The poorhouse was looked upon as merely a place of shelter or of custody; and in many states, especially in those less thickly settled, these conditions exist to-day.

But with increased knowledge of the means of treating disease, and with the growing appreciation of the need and value of preventive work, has come a specialization in the care and treatment of the various classes once sheltered under this common roof. One class after another has been provided for outside of the poorhouse, either by public or private agency, and, as a result, in many communities the houses which were once veritable bedlams have become quiet homes for the old who are left without support, and for the hopelessly sick and the utterly helpless defectives.

The insane have been, as a rule, the first class for which special provision has been made. Once looked upon as persons possessed of evil spirits, or as objects of some supernatural visitation, they were imprisoned or tortured, or, at best, left without the care and keeping necessary for the restoration of their reason. But as people came to understand that insanity was a physical disease, responsive to treatment as other bodily diseases, those who languished in poorhouses without care were placed in asylums,—institutions in which the custodial character was made prominent, but where treatment was afforded for the acute cases. To-day there is, in some of the states, practically no line of hopelessness, and all the insane are cared for in hospitals,—institutions in which treatment is the first object. In 1889 a law was passed by the New York legislature providing for the removal of all the pauper and indigent insane from poorhouses of the state to hospitals designed especially for their care and treatment, and in other states similar provision has been made.

This is only an illustration of what has been done for many other classes of the diseased, and for the defective. Institutions have been provided by the state for the education and the training of the blind and the deaf and dumb; for the custody of feeble-minded women, who in former times remained in the community, or perhaps were sent to the poorhouse, and permitted to transmit to future generations the defect or the taint which a wise care might have cut off with them; for the reformation of vicious and dissolute women, doomed, under the old system, to lives of vice and danger to the community; for the training of feeble-minded and idiotic children; and for the treatment and care of epileptics. The municipality and the private society have assisted the state in this specializing process, particularly in providing for the sick, for the relief of the poor in their homes, for the employment of the blind and for the education of neglected children.

There is one other class, once housed in the county almshouse, and now separately provided for in many states, of which special mention should be made—the dependent children. Allowed to associate with the adult paupers of all classes, as they once were, many of them grew up to be paupers themselves, or worthless members of society. In many states, therefore, laws have been passed prohibiting the detention of children in poorhouses after the age of two years. In some instances the public looks after these children in children's homes or in state schools, while in others this provision has been made in the most part by private charity. In some states, particularly New York, the provision for the care of children in special institutions has given rise to an evil almost as great as that which their creation was intended to remove,—less serious in character, perhaps, but of wider reach. The generous provision of public and of private charity for the care of children has, in the first place, led many parents to relieve themselves of the responsibility and expense of the care of their offspring during the years when the expense and care would be greatest, and in the second place, children brought up in immense institutions are deprived of the individual treatment and the care which a child should have. As a result of this, there has been noticeable lately a strong movement in favor of family homes for dependent children. Private societies have been organized for finding homes for children and for looking after them in the homes found, and in many states the public agents do more or less of the same work.

This specialization of relief has been in the direction of the prevention of pauperism; that is, of preventing permanent dependence upon the public. Many insane, placed in hospitals, have been restored to society in sound mind; the sick, once left to die in poorhouses, under special treat-

ment have been enabled again to support themselves; the blind and the deaf and the dumb have been taught trades; the feeble-minded and idiotic have been trained to self-help, and in some cases to self-support; the children, doomed by the association of the poorhouse to worthless lives, have been placed in homes to be reared as respectable, law-abiding citizens.

In recent poor-law legislation there is a noticeable movement in the direction of increased centralization of control. The relief of counties and towns has been brought under the supervision, and to an extent under the control, of the state, and certain private agencies have been made subject to the same authority. State boards of charities have been organized in many states, and in some there are commissions to look after certain classes of the dependent and defective. This movement is obliging all the communities in the states where the supervision is close and exacting to approach the highest standard of care and treatment, and is affording a practical medium for the transmission of improved methods. There is no national board with executive powers, but there is a national body of volunteers, who meet yearly and discuss questions relating to charities and correction. Public relief outside of institutions—that is, outdoor relief—has been found to be injurious in many communities, because it is not sufficiently discriminating, and because, no odium attaching to the recipient of such relief, it tends to invite the need which compels relief. This has led to a wide advocacy of the abolition of this kind of relief, and to its abandonment in some communities and reduction in others. In Brooklyn, for example, several years ago, outside relief, amounting to more than $100,000 a year, was entirely cut off in midwinter, and that, too, without increasing the applications for indoor relief, or causing any apparent distress. It has been entirely abolished in Philadelphia, and practically abolished in New York City. A great deal is given in small towns in outdoor relief; but the tendency seems to be to restrict this form of relief and to substitute for it indoor relief or private outdoor relief. Baron von Reitzenstein, a most distinguished student of this subject of poor-relief, in a paper read at the International Congress of Charities and Correction at Chicago in 1893, said: "Upon conviction of the evils by which the administration of outdoor relief of the poor through the public officers is hindered, and which are considerably increased through accompanying unsystematic private benevolence, rests that new movement which is gradually winning more ground in England, and thence has been transferred to America. It seeks to insure an individualizing outside care of the poor by the private organization, and to limit the public care as much as possible to the institution."

While state legislation with respect to the relief of the poor does not materially change except in making provision for the separate care of special classes of the poorhouse population, or in preventing the retention of certain classes in poorhouses, the tendency is, to-day, to give only indoor relief, or to employ the assistance of private agencies in giving outdoor relief. This tendency has developed concurrently with the growth of charity organization societies and with the spread of education in the matter of giving relief.

The poorhouse population decreased rather than increased in the decade 1880–90. There is no reliable estimate of the number of recipients of public outdoor relief. The number of poorhouse inmates in 1890 was 73,045, of whom a large portion were in the county poorhouses. There are county poorhouses in most of the states; in four there are only township poorhouses; in a few, both county and township.

The average age of poorhouse inmates is about fifty years, and one per cent of all persons sixty-five years of age or over are in poorhouses and one per cent in other benevolent institutions. The ratio of the foreign-born in poorhouses is three and two third times as great as of the native-born.

Besides the inmates of poorhouses there were, June 1, 1890, 111,910 beneficiaries in the benevolent institutions of the United States, of whom about one third received whole or partial support from the public. It is estimated that two thirds of the institutional relief given in this country is at the expense of the state or municipal treasuries.

With the wider knowledge of the evils of indiscriminate giving, with the earnest and increasing efforts that are being made to remove the causes of pauperism and crime, exerted through such agencies as public reformatories, houses of refuge, institutions for the training of defectives, etc., and such private agencies as charity organization societies and volunteer associations organized to co-operate with and to assist poor-law officials and superintendents of public institutions, the prospect of a better and more efficient administration of the poor-laws seems bright. There is, however, this hindrance: the poor-masters and superintendents of the poor are generally selected, not because of any special fitness for the office, but for political reasons. When civil-service reform reaches the poor-law officers the states will have a better administration of existing laws, and in time better poor-laws. See also Poor-laws, Vol. XIX, pp. 476–496; and Charity Organization, in these Supplements.

John H. Finley.

POPE, John, soldier, was born at Kaskaskia, Ill., on March 12, 1823, and was graduated from West Point in 1842, entering the engineers' corps. He served in the Mexican War, and was promoted for gallant and meritorious conduct at Monterey, and again at Buena Vista, and after the war the state of Illinois gave him a sword of honor. He explored the Red River of the North, surveyed New Mexico, surveyed a route for the Pacific railroad, and experimented with artesian wells for irrigating the great plains. Just before the Civil War he publicly criticised President Buchanan's policy, and was summoned before a

court martial, but the charges were not pressed. In May, 1861, he was made bigadier-general and commanded in Missouri. He captured New Madrid and Island No. Ten, and was then called to Washington and put in charge of the Army of Virginia. He was successful at Cedar Mountain, but was disastrously defeated by Stonewall Jackson at the second battle of Bull Run, whereupon he asked to be relieved of his command, saying that his defeat had been caused by lack of support by General McClellan's officers. His request was granted, and he was sent to the northwest where he conducted a campaign against the hostile Sioux. He was made a major-general in the regular army in 1882, and in 1886 was retired for age. He wrote a book in vindication of his Virginia campaign, entitled *The Virginia Campaign of July and August, 1862*, and also a particularly valuable report entitled *Explorations from the Red River to the Rio Grande*. He died on September 23, 1892. W.F.J.

GEN. JOHN POPE.

POPE, John, statesman, was born in Virginia in 1770, and was graduated from William and Mary College. He was U. S. Senator from Kentucky in 1806–12, governor of the territory of Arkansas in 1829–35, and a representative in Congress from Kentucky in 1837–43. He ranked among the ablest lawyers of his day, especially in criminal cases. He died on July 12, 1845. W.F.J.

POPHAM, Sir John, jurist; born at Wellington, Somersetshire, England, in 1531. A lawyer of fine powers, he was made a sergeant in 1571; solicitor-general in 1579; speaker of the House of Commons in 1581; attorney-general, and chief justice of the queen's bench in 1592. As such he presided at the trials of Mary Queen of Scots, Essex, Raleigh, etc. He died June 1, 1607. G.J.H.

POPISH PLOT. See Oates, Vol. XVII, pp. 716, 717.

POPLAR BLUFF, a village and the capital of Butler County, southeastern Missouri, 166 miles S. of St. Louis, on the St. Louis, Iron Mountain and Southern railroad, and on the David River. It is an important shipping-point of a very fertile and well-timbered region. It has stockyards, and a large stave factory employing eight hundred hands. It is the seat of a seminary. Population 1900, 4,321.

POPPY, the common name of species of the family *Papaveraceæ* in general, but specially applied to species of *Papaver*, the most famous of which is *P. somniferum*, the opium poppy. Many of the species are cultivated for ornament.

PORCELAIN. See Pottery and Porcelain, Vol. XIX, pp. 617–664; and Ceramic Art and Pottery Industry in the United States, in these Supplements.

PORCH. See Architecture, Vol. II, p. 414.

PORCHER, Francis Peyre, physician; born in St. John's, Berkeley Co., S. C., Dec. 14, 1825, the descendant of a Huguenot family. He graduated with honors in 1845 from South Carolina College, entered the medical college of Charleston, and graduated with the degree of M.D. in 1847. He subsequently studied medicine in France and Italy, entered upon the practice of his profession in South Carolina, and during the Civil War did good service in the Confederate hospitals. While in practice he engaged with some activity in literary work, producing *Medical Botany of South Carolina* (1849); *Illustrations of Disease* (1860); *Clinical Investigations* (1861), etc. He died in Charleston, Nov. 19, 1895. G.J.H.

PORCUPINE ANT-EATER. See Echidna, Vol. VII, p. 543.

PORGY or PORGEE, a popular name locally applied to several fishes. In Europe the *Pagrus vulgaris* is called porgy. Along the Atlantic coast of the United States the name is given to the scup (*Stenotomus argyrops*); q.v., in these Supplements. The name is often confused with that of pogy or menhaden (*Brevoortia tyrannus*). Other fishes have been called porgies. The name is apparently a corruption of *pagrus*, and hence properly belongs to fishes of the genus *Pagrus*.

PORIFERA, a phylum. See Zoölogy, Vol. XXIV, p. 8.

POROGAMY, a name recently applied in botany to cases where the pollen-tube enters the ovule through the micropyle, as distinguished from the few cases in which it enters the ovule in some other way. See Chalazogamy, in these Supplements.

PORPHYROGENITUS. See Constantine VII, Vol. VI, p. 269.

PORPHYRY, a philosopher. See Neo-Platonism, Vol. XVII, pp. 345, 346.

PORSENA, Lars. See Rome, Vol. XX, p. 754.

PORTA, Giacamo. See Architecture, Vol. II, p. 384.

PORTAGE, a city and the capital of Columbia County, central Wisconsin, 30 miles N. of Madison, on the Wisconsin River, the ship-canal connecting it with the Fox River, and on the Chicago, Milwaukee and St. Paul and the Wisconsin Central railroads. It is an important manufacturing town and a center of trade, having grain-elevators, iron-works, a hosiery factory and plow factory. Granite, sandstone and jasper are found in the vicinity. Population 1890, 5,143; 1900, 5,459.

PORTAGE LA PRAIRIE, Canada, a town and important railway junction of Macdonald County, Manitoba, on divisions of the Canadian Pacific, the Northern Pacific and the Canadian Northern railroads, 50 miles west of Winnipeg. It is in a fertile plain watered by the Assiniboine River, 30 miles by rail south of Lake Manitoba, and has thriving agricultural industries. Population, 1891, 3,363; 1901, 3,901. C.L.S.

PORT ARTHUR, a town in Algoma, Ontario, on

Thunder Bay, where it is joined by a small river, and on the Canadian Pacific railroad. It also has regular steamboat connection with Owen Sound, on Georgian Bay. It is the seat of extensive lumbering and mining interests, and in the vicinity are large quarries of marble and building-limestone. There are gold and silver mines forty miles southwest of the town. Grain and fish, gold, silver and lumber are shipped. Population 1891, 2,698; 1901, 3,214.

PORT ARTHUR or LUSHUNKU, a naval station of the province of Shing King, China, about 275 miles E. of Pekin, at the southern point of the Liaotung Peninsula, in the Gulf of Pechili. It was taken by Japan in 1894, but later, at the instance of Russia, France and Germany, she restored it to China by whom it was, in turn, leased to Russia. The Japanese captured it from the Russians January 1, 1905. See Russo-Japanese War.

PORT BYRON, a village of Cayuga County, central New York, 10 miles N. of Auburn, on the Oswego River, the Erie canal and the New York Central and Hudson River and the West Shore railroads. It contains an academy, and manufactories of paper, shirts and barrels. Population 1900, 1,013.

PORT CARBON, a borough of Schuylkill County, central eastern Pennsylvania, 3 miles E.N.E. of Pottsville, on the Philadelphia and Reading railroad. It is engaged in coal-mining and in the manufacture of iron. Population 1900, 2,168.

PORT CHESTER, a village of Westchester County, southeastern New York, on Long Island Sound, 25 miles N.E. of New York, and on the New York, New Haven and Hartford railroad. It is in a very beautiful and fertile region, and contains an academy and several foundries, stove and iron-bolt factories and mills. Population 1900, 7,440.

PORT CLINTON, Ohio, the seat of Ottawa County, a village settled in 1827 on Lake Erie, at the outlet of Portage River, and on the Lake Shore railroad, 13 miles west of Sandusky. It has a fine harbor and trades with other lake ports in farming, fishing, lumber and other products. Population, 1890, 2,049; 1900, 2,450. C.L.S.

PORT DEPOSIT, a town of Cecil County, northeastern Maryland, near the mouth of the Susquehanna, four miles N. of Havre de Grace, on the Washington branch of the Pennsylvania railroad. It is an important lumber-shipping and granite-quarrying place. Population 1890, 1,908; 1900, 1,575.

PORT ELIZABETH, a seaport and commercial town in the southeast of Cape Colony, South Africa; chief city of a district of the same name; situated on a promontory at the west end of Algoa Bay, facing the Indian Ocean, connected by railroad with Kimberley, on the north, with Grahamstown, 85 miles away, toward the northeast, and with Bathurst, the chief maritime city of the colony; harbor good and under constant improvement; has extensive evaporating salt-works. Population 1891, 23,266. See also Port Elizabeth, Vol. XIX, p. 541.

PORTER. See Brewing, Vol. IV, p. 241.

PORTER, Alexander, an American lawyer and statesman; born near Omagh, Tyrone, Ireland, in 1786. He came to the United States in 1801, settled in Nashville, Tenn., and was admitted to the bar there in 1807. In 1810 he removed to St. Martinsville, La., and in 1811 was a member of the first constitutional convention in the State. Before reaching the age of thirty he was successful at the bar and as a sugar-planter. He was a judge of the supreme court of Louisiana from 1821 to 1833, and was instrumental in framing the peculiar system of jurisprudence which obtains in Louisiana,—a mixture of Spanish, French, and the Roman civil law. He was a Whig in politics, and represented his State in the United States Senate from Jan. 6, 1834, to Jan. 5, 1837, and from Dec. 4, 1843, to Jan. 13, 1844, on which day he died in Attakapas, La. E.E.T.

PORTER, Charles T., an American mechanical engineer; born in Auburn, New York, Jan. 18, 1826; graduated at Hamilton College, studied law and practiced in Rochester and New York, but gave up the profession for engineering; designed an engine known as the Porter-Allen engine and formed a partnership with J. F. Allen for its manufacture. He also invented governors for stationary and marine engines, and was one of the founders of the American Society of Mechanical Engineers.

PORTER, David, naval commander, son of Captain David Porter and father of Admiral David D. and Commodore William D. Porter, was born in Boston on February 1, 1780, and became a midshipman on the *Constellation* under Truxton in 1798. In the War of 1812 he commanded the frigate *Essex*, captured the *Alert*, the first prize of the war, went around Cape Horn into the Pacific, took many prizes, and was at last overcome in a desperate battle with two British ships near Valparaiso. In 1826 he resigned his commission because of the unjust judgment of a court martial, and became commander-in-chief of the Mexican navy. After the Spanish-Mexican War he returned home, and was U. S. consul to the Barbary states, and chargé d'affaires at Constantinople. He wrote a history of his cruise in the *Essex*. He died in Constantinople on March 3, 1843. W.F.J.

PORTER, David Dixon, naval officer; born in Chester, Pa., June 8, 1813; son of Commodore David Porter; was appointed a midshipman in the Mexican navy at the age of thirteen, and in the United States navy at sixteen, and at the outbreak of the Civil War was assigned as a lieutenant to the *Pomeroy*. In the attack by Farragut on the forts of the lower Mississippi, Porter commanded the mortar boats, with which he afterward did efficient work before Vicksburg. Made commander of the Mississippi squadron in September, 1862, he actively aided in opening that river, running the forts at Vicksburg on the night of

ADMIRAL PORTER.

April 16, 1863. He subsequently commanded the naval forces in the two attacks on Fort Fisher. After the war he was promoted vice-admiral, and in 1870 succeeded Farragut as admiral. As vice-admiral, he was made superintendent of the Naval Academy at Annapolis, where his energy was of great service in upbuilding the institution. The twenty-one years through which Admiral Porter held his high grade were years of peace. He was the author of *A Life of Commodore David Porter;* a novel called *Allan Dare and Robert le Diable; Incidents and Anecdotes of the Civil War; Harry Martime;* and a *History of the Navy in the War of the Rebellion.* He also wrote several valuable reports, and his essays and testimony before committees of Congress showed a vigorous and progressive interest in the problems of national defense and naval construction. He died in Washington, D. C., Feb. 13, 1890. G.J.H.

PORTER, Fitz-John, an American soldier; born in Portsmouth, N. H., Aug. 31, 1822. He graduated at West Point in 1845, where he was an instructor, 1849–55; served in the Mexican war; assistant adjutant-general during the Kansas troubles and in the Utah expedition. He was commissioned colonel, U.S.A., May 14, 1861; brigadier-general, U. S. Vols., May 17, 1861; major-general, Vols., July 4, 1862, commanding the 5th Army Corps; and brevetted brigadier-general, U.S.A., for gallant conduct at Chickahominy. On a charge of disobedience of orders at the second battle of Bull Run, he was cashiered with disgrace, but in 1886 was fully reinstated as colonel, U.S.A., completely exonerated, and retired at his own request. He engaged in various occupations until his death, including the positions in New York of commissioner of public works, 1875–76; police commissioner, 1884–88; fire commissioner, 1888–89; and cashier of the post-office. He died in Morristown, N. J., May 21, 1901. E.E.T.

PORTER, Horace, an American soldier and public man; born in Huntingdon, Pa., April 15, 1837. He graduated at West Point in 1860, and served throughout the Civil war, rising from lieutenant to brigadier-general, and received a Congressional medal of honor for gallantry at Chickamauga. He was private secretary to President Grant, 1869–77; and later was connected with several railroad and other corporations, with offices in New York. He was largely instrumental in the erection of the Grant mausoleum on Riverside Drive, New York, and was the orator at its dedication, April 27, 1897. He is the author of *Campaigns with Grant.* In 1897 he was appointed ambassador to France by President McKinley. E.E.T.

PORTER, Josias Leslie, educator; born in Drumgowan, Ireland, Oct. 4, 1823. He graduated at the University of Glasgow in 1841; studied theology at Edinburgh, and was ordained minister in 1846. He was sent to Damascus as a missionary to the Jews in 1849, and traveled widely in Syria and Palestine. In 1860 he was made professor of Biblical criticism in the Presbyterian College at Belfast, and in 1879 became president of Queen's College in that city, where he died March 16, 1889. He wrote *Five Years in Damascus* and other works on the East. G.J.H.

PORTER, Noah, clergyman, author, and educator, was born at Farmington, Conn., on December 14, 1811, and was graduated from Yale College in 1831. He was master of the Hopkins School at New Haven for two years, tutor at Yale for two years, and pastor of Congregational churches for ten years. In 1846 he became professor of moral philosophy and metaphysics at Yale, and in 1871 became president of that college, still retaining the professorship. Under his administration the college and university were greatly developed and advanced in all respects. Indeed the history of his presidency is the history of modern Yale. In 1886 he retired from the presidency but retained his professorship, and he died on March 4, 1892. He was the chief editor of recent editions of *Webster's Dictionary*, and was the author of a number of standard works, including *The Human Intellect*, *Elements of Intellectual Science*, *Books and Reading*, *Science and Sentiment*, *Science of Nature vs. Science of Man*, *The Elements of Moral Science*, and *A Critical Exposition of Kant's Ethics.* W.F.J.

DR. NOAH PORTER.

PORTER, Thomas Conrad, an American educator; born in Alexandria, Pa., Jan. 22, 1822. He graduated at Lafayette College in 1840, and at Princeton Theological Seminary in 1843. He was professor of natural sciences in Marshall (later Franklin and Marshall) College, 1848–66, in which latter year he became professor of botany, zoology, and geology in Lafayette College. He retired from active duty, Jan. 1, 1897, but was curator of the botanical collection, professor emeritus, and dean of the Pardee Scientific School, until his death. He made extensive researches in Finnish literature, and was the author of *A Synopsis of the Flora of Colorado*, *The Botany of Pennsylvania*, etc. He died in Easton, Pa., April 27, 1901. E.E.T.

PORT EWEN, a village of Ulster County, southeastern New York, on the right bank of the Hudson, four miles below Kingston, near the West Shore railroad. It is an important point for the transhipment of coal. Population 1890, 1,211.

PORT GIBSON, a village and the capital of Claiborne Co., Mississippi, 29 miles S. of Vicksburg, on Bayou Pierre, 20 miles from its mouth, in the Mississippi, and on the Illinois Central railroad. It has two academies, Masonic hall and county buildings. Population 1890, 1,524; 1900, 2,113.

PORT HAMILTON. See Corea, Vol. VI, p. 347.

PORT HENRY, a village of Essex County,

N. Y., on Lake Champlain, 40 miles N. of Whitehall, on the Delaware and Hudson railroad; has valuable iron-mines and several furnaces and bloomeries. Much magnetic iron ore is exported. Population 1900, 1,751.

PORT HUDSON, a village on the east bank of the Mississippi river, in East Baton Rouge Parish, Louisiana. In the fall of 1862 it was strongly fortified by the Confederates and garrisoned with 6,000 men under Gardner. Perceiving that it was a desirable point from which to command the river from Vicksburg to New Orleans, on March 8, 1863, Banks with a land force of 12,000 and Farragut with his fleet of gunboats and mortar-boats made a concerted attack upon the works, which resulted in a repulse for the Union forces. On May 23d Banks invested the place with 18,500 men, and on the 27th a general assault was made, which again resulted in defeat. The siege continued until July 9, 1863, when, on hearing the news of the fall of Vicksburg, the Confederate commander surrendered. The total Union loss was 4,300; the Confederate loss before the surrender, 800. Port Hudson was the last fortified place of importance on the Mississippi to surrender to the Unionists. Population 1900, 300.

PORT HURON, a city of Michigan; has 25 hotels, a fine custom-house, shipyards, dry-docks, saw-mills, grain-elevators, the machine and railroad-shops of the Grand Trunk railroad, flour-mills, foundries, carriage and wagon shops, marble-works, cigar factories, planing-mills, engine-works, breweries, bottling-works, and lime-kilns; and is supplied with gas, city water, and electric lights and railway. Much pine timber is brought down by the Black River. A railway tunnel passing under the St. Clair river connects the town with Sarnia, in Canada, and steamboats ply daily, except in winter, between Port Huron and Detroit. Population 1890, 13,543; 1900, 19,158. See also PORT HURON, Vol. XIX, p. 542.

PORT JEFFERSON, a village of Suffolk Co., N. Y., on Long Island Sound, 48 miles E. of New York, on the Long Island railroad; has a good harbor, and is engaged in shipbuilding. Pop. 1890, 2,026.

PORT JERVIS, a village of New York, 60 miles N.W. of New York city; has railroad-shops, planing and other mills, glassworks, and factories of boots and shoes, gloves, and watch-cases. Population 1900, 9,385. See PORT JERVIS, Vol. XIX, p. 543.

PORTLAND, Connecticut, a town of Middlesex County, in the central part of the state. It lies on the Connecticut River, is reached by the New York, New Haven and Hartford railroad, and has extensive quarries of building stone. Its population in 1900 was 3,856. W.F.J.

PORTLAND, a city, the capital of Jay Co., Ind., on Salamonie river and on the Grand Rapids and Indiana and the Lake Erie and Western railroads, 48 miles S. of Fort Wayne; is in a lumbering region; has a natural-gas supply, lumber and flour mills, and wood-working industries. Population 1900, 4,798.

PORTLAND, the largest city and chief seaport of Maine; has a large granite government building of great beauty, a post office of white marble, about 20 school buildings, and 9 libraries containing over 70,000 volumes. In 1900, 639 manufacturing establishments reported to the census bureau, with an aggregate capital of $6,991,251, 6,310 hands, receiving $3,132,242 in wages, and annual products, $11,440,201. The city is supplied with electric and gas lights, sewer systems, and street-railways. Its assessed valuation is about $40,000,000, and the net debt $15,000,000. Population 1890, 36,425; 1900, 50,145. See PORTLAND, Vol. XIX, pp. 543, 544.

PORTLAND, a village of Ionia Co., Mich., on the Grand River, 28 miles W.N.W. of Lansing, on the Detroit, Lansing and Northern railroad, in a wheat-raising region; has abundant water-power, and manufactures sashes, blinds, doors, staves, furniture, lumber, land-rollers, refrigerators, washing-machines, and woolen goods. Pop. 1890, 1,678; 1900, 1,874.

PORTLAND, a city of Oregon. Its most important buildings and institutions include the City Hall, Chamber of Commerce, the Union Depot, the Hotel Portland, the Bishop Scott Academy, St. Helen's Hall, St. Michael's Academy, Portland Academy, the medical departments of the state and Willamette universities, and a business college. In 1900, its factories numbered 1,064, with $13,331,500 capital, employing 8,572 hands, and turning out products valued yearly at $23,451,132. Its streets are granite paved blocks, and provided with horse, cable, and electric railroads. It owns its water-works, and has electric and gas-light plants, and a free library containing 16,000 volumes. Assessed valuation about $60,000,000; debt less than $3,000,000, a large part being in water-bonds. Population 1890, 46,385. In 1891 Albina and East Portland were annexed. Population 1900, 90,426. See PORTLAND, Vol. XIX, p. 544.

PORTLAND UNIVERSITY, a Methodist Episcopal co-educational institution, in Portland, Oregon, founded in 1890, and in 1898 merged into the Consolidated University, at University Park, Oregon, which, in 1898, had 17 instructors, 182 students, and a library of 1,500 volumes.

PORT NORRIS, a post village in Cumberland Co., N. J., on the Maurice river. Pop. about 1,800.

PORT ORCHARD, a town and the county seat of Kitsap County, Washington, in the central-western part of the state. It lies on one of the southern arms of Puget Sound, fifteen miles west by south from Seattle, and is reached by steamer on Puget Sound. It is the site of a United States naval station. Its population in 1900 was 197. W.F.J.

PORTO RICO OR PUERTO RICO. See Vol. XIX, p. 547. This island was formerly a Spanish colony, but, by the treaty of peace signed at Paris Dec. 10, 1898, ratified by the United States Senate Feb. 6, 1899, and signed by the Queen-Regent of Spain March 17, 1899, it was ceded to the United States. According to the most recent statistics the area of the island is 3,596 square miles, and the population, by the census of Dec. 31, 1887, was 798,566 (399,022 males, and 399,544 females); these figures including about 326,000 negroes, though it is affirmed that two-thirds of the population have more or less mixed blood in them. Since 1887 the population increased, and was (1900) by the U. S. cen-

sus, 953,243. Spanish is the language almost universally spoken; and only about 20 per cent of the people can read and write. The island is divided into seven provinces, Aguadilla, Arecibo, Bayamon, Guayama, Humacoa, Mayagüez, and Ponce. The capital is San Juan, with a communal population, by the census of 1900, of 32,048. The other chief towns, with their communal populations by the census of 1900, are: Ponce, 27,952; Utuado, 31,209, Mayagüez, 15,187; Yauco, 24,326; Juana Diaz, 20,966; San Germán, 19,827; Lares, 17,097; Cabo Rojo, 16,659; Adjuntas, 16,288; Aguadilla, 16,140; Bayamon, 15,164; Humacoa, 14,726; Caguas, 14,603; Guayama, 13,472; Ciales, 12,948; Yubacoa, 12,862; Hato Grande, 12,626; La Isabela, 12,450; Añasco, 12,413; Cayey, 12,389; Barros, 11,660; Manati, 11,479; Arecibo, 8,008; Moca, 11,076; Vega Baja, 10,586; Coamo, 10,495; and Patillas, 10,376.

Climate. The climate of Porto Rico, though tropical, is pleasanter and more healthful than that of most of the West India Islands. The average annual temperature, as deduced from records covering twelve years, is 78.9°F.; the highest temperature recorded during that time being 100.8°F.; and the lowest 56.1°F. The average temperature of the hottest month, June, is 81.5°, and that of the coolest, February, is 75.7°. The mean annual rainfall during the same period was 59.45 inches, the greatest being 82.64 inches, and the least 45.79 inches. The rainy season lasts eight months, beginning with April and ending with November.

Currency and Finance. At the time of the cession to the United States the currency was on a silver basis, the standard of value being the silver peso, containing 385.5 grains of silver 0.835 fine, and of course varying in gold value with the market price of silver. In 1894 it was worth about 50 cents in gold; in 1895 about 52 cents; and in 1897–99 about 46 cents. The chief coins are the peso, usually called a dollar, worth 100 centavos, the medio peso (50 centavos), the peseta (20 centavos), the real (10 centavos), and the medio real (5 centavos), all of silver; and bronze and copper coins of one and two centavos. On Jan. 23, 1899, however, President McKinley issued an order that on and after Feb. 1, 1899, these Porto Rican coins should be received for customs, taxes, and public and postal dues at the following fixed rates in United States money:

The peso	$0.60
The medio peso	30
The peseta	12
The real	06
The medio real	03

He also ordered that the bronze and copper coins of one and two centavos should be received at their face value for fractional parts of a dollar in a single payment to an amount not exceeding 12 cents (one peseta). The metric system of weights and measures is in use in the island. In 1894–95 the revenue was 4,454,958 pesos, and the expenditure 3,903,667 pesos.

Railways, Post Offices, and Telegraphs. In 1900 there were 159 miles of railway in operation, and 170 miles under construction. In 1894 there were 89 post offices, with a total delivery of letters and postal cards of 2,687,954 in the internal service (including Spain), and 438,962 in the external service. In 1892 there were 483 miles of telegraph, with 672 miles of wire, which transmitted 152,786 dispatches.

Live-Stock. According to official statistics taken in October, 1896, the number of live-stock at that date was as follows:

Oxen and Cows	303,612
Horses	65,751
Swine	13,411
Goats	5,779
Mules	4,467
Sheep	2,055
Asses	717

Products. Over 1,100,000 acres are devoted to pastures, about 122,000 to coffee, about 61,000 to the sugar-cane, and about 2,000 to tobacco. The chief products are coffee, sugar, molasses, honey, tobacco, cotton, maize, rice, cacao, bananas, cocoanuts, oranges, lemons, limes, pineapples, spices, ginger, hides, mahogany, cedar, ebony, dye-woods, and guano. The annual product of coffee is over 28,000 tons; of sugar, 47,000 tons; and of tobacco, 12,000,000 pounds; and about 200,000,000 bananas, 6,500,000 oranges, and 2,500,000 cocoanuts are produced annually. The mineral resources are undeveloped. Iron, copper, lead, zinc, and coal are obtained; also gold in small quantities; lignite and yellow amber are found at Utuado and Moca; and there are salt-works at Cabo Rojo, Guanica, and Salinas, and quarries of excellent gypsum in the eastern part of the island. Deposits of marble, limestone, and building stone of other kinds are known to exist, but they have not been developed. Hot springs and mineral waters are found at Coamo, Juana Diaz, San Sebastian, San Lorenzo, and Ponce. Sugar-making is the chief industry, but there are also foundries and tanneries; and soap, matches, and ice are manufactured to some extent. The Standard Oil Company has a small factory on San Juan harbor, opposite the town, where petroleum from the United States is refined.

Commerce. In 1900 the entries at Ponce were 589 vessels, of 500,652 tons; and the clearances, were about the same. In 1888–1900 the value in pesos of the imports and exports was as follows:

YEAR	IMPORTS	EXPORTS
1888	14,389,673	11,999,255
1889	14,177,577	11,066,684
1890	18,230,385	10,710,519
1891	16,864,764	9,885,999
1892	17,084,610	16,076,312
1893	17,320,454	16,745,393
1894	19,778,587	17,295,535
1895	17,446,065	15,798,590
1896	18,945,793	19,006,663
1900	9,367,000	8,634,000

In 1896 the value in pesos of the chief articles of export was: coffee, 13,846,000; sugar, 4,242,000; tobacco, 423,000; cattle, 139,000. Other important exports are guano, honey, and molasses. The chief imports are cotton goods, shoes, sandals, rice, soap, oil, preserved food, felt hats, flax and hemp goods, wax and stearin, wine, soup pastes, flour, wooden manufactures, beans, woolen goods, chocolate and confectionery, packing paper, leather, perfumery, butter, and silks. During the years 1890–1900 the value in United States currency of the United States

imports from and exports to Porto Rico (exclusive of gold and silver coin and bullion) was as follows:

YEAR	U. S. IMPORTS FROM PORTO RICO	U. S. EXPORTS TO PORTO RICO
1890	4,053,626	2,297,538
1891	3,164,110	2,155,234
1892	3,248,007	2,856,003
1893	4,008,623	2,510,607
1894	3,135,634	2,720,508
1895	1,506,512	1,833,544
1896	2,296,653	2,102,094
1897	2,181,024	1,988,888
1898	2,414,356	1,505,946
1899	3,179,827	2,685,848
1900	5,661,000	7,415,000

Previous to the cession of the island to the United States, the tariff greatly favored Spain at the expense of other nations, but on Feb. 1, 1899, a new tariff was put into force, on the "open-door" principle, placing all countries on an equality as regards goods imported into the island.

Recent History. In 1870 Porto Rico with its dependencies was made a province of Spain, with representatives in the Spanish Cortes, the chief official, as theretofore, being a governor appointed by the crown. The last traces of slavery were abolished on March 23, 1873, by the abrogation of the system of forced labor. Early in 1895 General Gamir, the Spanish governor-general, under instructions from the home government, withdrew from circulation all the Mexican and Spanish coins, then the principal currency of the island, and substituted special silver coins minted in Spain. This created much discontent, and a secret society was formed having for its object the independence of the colony. Through the treachery of one of the members, however, the conspiracy came to the knowledge of the government, and in Dec., 1895, the leaders were arrested, and the design was checked. When, in Feb., 1895, the revolt broke out in Cuba, the Spanish Cortes, no doubt with a view to prevent it from spreading to Porto Rico, "the ever loyal and faithful isle," voted, on March 15, 1895, for a scheme of administrative reforms in the direction of autonomy; and early in 1897 the Queen-Regent signed a decree putting the scheme into effect. It provided for the division of the island into two regions, and for the creation of a legislative assembly of twelve deputies, six from each region; also of an administrative council, consisting of the leading officials of the island, six deputies and six councillors nominated by royal decree; also of municipal boards of aldermen for the cities and towns. The suffrage was limited, as previously, to persons paying a combined annual tax of $5, and to members of the learned professions. The more extreme autonomists in the colony considered the scheme inadequate, and refused to vote at the municipal elections held on Feb. 18, 1897, and in consequence the conservatives won a sweeping victory. On March 27, at Yauco, a few malcontents made an abortive attempt at revolution, but they were dispersed by the Spanish troops, and most of them were afterward arrested. The people generally, however, finally accepted the autonomist régime, and in Dec., 1897, Luis Munez Riviera, the leader of the autonomists, was elected president, or premier. After a few months' trial the new mode of government seemed to be in a fair way of success, when, in April, 1898, war broke out between Spain and the United States. The first experience of actual warfare which Porto Rico underwent was on May 12, when a United States squadron, under Admiral Sampson, bombarded the forts of San Juan, an operation which effected little or nothing beyond giving a little gunnery practice to the crews. After the surrender of Santiago de Cuba on July 17, however, the invasion and conquest of Porto Rico were determined on; and on July 21 General Nelson A. Miles embarked from Cuba with 3,415 troops, and, after making a feint at landing on the northeast coast, suddenly appeared at Guanica, on the southwest coast (July 25), effected a landing unopposed, and occupied the town. Reinforcements followed, until General Miles's total force amounted to nearly 17,000 men, who, however, were mostly untried volunteers. These were formed into two divisions, each consisting of three brigades, the first division being under the command of Major-General John R. Brooke, and the second under that of Major-General James H. Wilson. Ponce surrendered on July 28, its commander, Colonel San Martin, being afterward court-martialled by the Spanish authorities and shot (Aug. 4). In a brief campaign lasting only nineteen days, by skilful strategy, bodies of Spanish troops were defeated or captured in six engagements, and a large part of the island was occupied by the American troops, the total loss to the victors being only three killed and 40 wounded; the loss of the enemy being estimated at nearly ten times that number. (See also United States, XXIX, p. 393.) Hostilities terminated on Aug. 13, on receipt of the news that the peace protocol had been signed at Washington on the preceding day. The protocol provided for the cession of Porto Rico to the United States; and on Aug. 16, President McKinley appointed Major-General Brooke, Rear-Admiral Schley, and Brigadier-General W. W. Gordon commissioners to arrange the evacuation of the island. Shortly afterward General Miles, with nearly 5,000 men, returned to the United States, leaving General Brooke with 12,000 men, to complete the occupation. On Sept. 20 the evacuation by the Spaniards began; and on Oct. 18 the control of the island was formally transferred to the United States. Later in October President McKinley appointed Major-General Guy Vernor Henry military governor of the island. Some eight months later, General Geo. W. Davis succeeded General Henry as governor; and about this period the Commission appointed to study the civil conditions and resources of the island reported to Secretary Root, with some valuable recommendations, including a form of civil government to take the place of the then existing military régime. Early in 1899, General John Eaton was assigned the task of reorganizing the school system of the island. A devastating hurricane swept over Porto Rico on Aug. 8, 1899, causing great loss of property and doing much damage to the holdings of the peons. The island is exceedingly fertile, coffee, sugar, and molasses being the chief crop; tobacco is also raised, as is Indian corn and a variety of vegetables and tropical fruits.

PORT RICHMOND, a village on the north shore of Staten Island, N.Y., 2½ miles from West New Brighton, on the Staten Island Rapid Transit railroad; 9 miles from New York, with which it has daily steamboat connections; has brick, white-lead, and linseed-oil factories. Pop. 1890, 6,290.

PORT ROYAL, a village on the Atlantic Coast, in Beaufort County, South Carolina. At the beginning of the Civil War the harbor of Port Royal was defended by two forts, Fort Walker and Fort Beauregard, which were garrisoned with 1,700 men under the Confederate generals Drayton and Ripley, and by six gunboats commanded by Commodore Tattnall. An attack was made Nov. 7, 1861, by the Union frigate *Wabash*, in command of Commodore Dupont, with 14 gunboats. The fleet entered the harbor and fired on both forts simultaneously, then concentrated their attack on Fort Walker, which surrendered in three hours. Fort Beauregard surrendered soon afterward. Pop. 1900, 601.

PORTSMOUTH, a city of New Hampshire. The city has two libraries containing over 26,000 volumes, a valuable museum and several homes and asylums. Population 1890, 9,827; 1900, 10,637. See PORTSMOUTH, Vol. XIX, p. 550.

PORTSMOUTH, a city of Ohio. It has breweries, stone-mills and manufactures stoves, nails, steel springs, furniture, machinery, boots, veneer, wheels and fire-brick. It is in a fertile agricultural region, which is also rich in iron-ore. Pop. 1890, 12,394; 1900, 17,870. See PORTSMOUTH, Vol. XIX, p. 550.

PORTSMOUTH, a city of Virginia, in the southeastern corner of the state. It was formerly the county seat of Norfolk County, but is now independent of that county. It lies near Norfolk, and shares the commercial importance of the latter city, having a commodious railroad and steamship service. Its population in 1900 was 17,427. See also in Vol. XIX, pp. 550–551. W.F.J.

PORT TOWNSEND, a city and the county seat of Jefferson County, Washington, in the northwestern part of the state. It lies at the northeastern end of a peninsula between Fort Discovery Bay and Puget Sound, near the entrance to the latter, and having a fine deep-water harbor. It is largely interested in the lumber trade and has also flour mills and hardware and machine shops. It is the site of Federal fortifications for commanding the entrance to Puget Sound, and of a quarantine station and marine hospital. The Port Townsend Southern railroad connects it with the southern part of the state, and it has a steamboat service on the sound and northward to Victoria, B. C. It is about 40 miles north by west from Seattle, and had in 1900 a population of 3,443. W.F.J.

PORTUGAL. (For general article, see PORTUGAL, Vol. XIX, pp. 551–574.) The population in 1900 was 5,428,659. The reigning king is Carlos I; born Sept. 28, 1863, son of Luis I and his Queen Maria Pia, daughter of the late King Vittorio Emanuele, of Italy; married May 22, 1886, Marie Amélie, daughter of Philippe Duc d'Orléans, Comte de Paris; succeeded to the throne Oct. 19, 1889. Carlos I has a civil list of $396,000, while his consort has a grant of $65,000. The whole grants to the royal family amount to $570,000.

CONSTITUTION AND GOVERNMENT. The crown is hereditary in the female as well as male line, but with preference of the male in case of equal birthright. The constitution recognizes four powers in the state —the legislative, the executive, the judicial, and the "moderating" authority, the last of which is vested in the sovereign. There are two chambers, the "Camera dos Pares," or House of Peers, and the "Camera dos Deputados," or House of Commons, which are conjunctively called the Cortes. The law of July 24, 1885, abolished hereditary peerages, though only by a very gradual process. The law of 1895, made without the concurrence of the parliament, fixed the number of life peers which are to be nominated by the crown at 90, exclusive of the 12 bishops of continental dioceses and princes of the royal blood. The elective portion of the chamber provided for in the law of 1885 was done away with. The members of the second chamber are chosen in direct election by all citizens, 21 years of age, who can read and write, or who pay taxes amounting to $540. The deputies must have an income of at least $432 per annum; but lawyers, professors, physicians, or the graduates of any of the learned professions need no property qualification. The lower house consists of 120 deputies, elected by universal suffrage, of which six are chosen by the colonies. The annual session lasts three months, and fresh elections must take place at the end of every four years. In case of dissolution a new parliament must be called together immediately. The general Cortes meets and separates at specified periods, without the intervention of the sovereign; and the latter has no veto on a law passed twice by both houses.

The executive authority rests, under the sovereign, in a responsible cabinet divided into seven departments, in charge of the ministers. The sovereign is permitted, in important cases, to take the advice of a council of state, or privy council, consisting, when full, of 13 ordinary and three extraordinary members, nominated for life. During the years 1894–95, parliamentary government was suspended, and legislation was accomplished by royal decrees. It was during this period that the decrees changing the constitution of the Cortes were promulgated. Other proclamations were made, by one of which the Azores received autonomous government (March 24, 1895). Parliamentary elections were held Nov. 17, 1895.

The possessions of Portugal in Africa are Cape Verde Islands; Prince's and St. Thomas's islands; Guinea; Kongo, Benguela, and Mossamedes, comprising the province of Angola; and East Africa. In Asia: Goa, Daman, and Diu, in India; part of Timor I; and Macao, in China. Population of colonies, 9,267,444; area, 801,060 square miles.

FINANCE. The budget estimates for the fiscal year 1901–02 were: revenue, $53,269,000; expenditure, $55,239,000. In 1900, the total debt of Portugal was about $765,000,000.

DEFENSE. The fortified places in Portugal of

the first class are Lisbon, Elvas, and Angra (Azores); those of Lisbon are the only thoroughly modern ones. Capital, Lisbon, pop. (1900), 357,000.

The army of the kingdom is formed partly by conscription and partly by voluntary enlistment. Its organization is based on the law of 1887, modified Sept. 7, 1899 and Dec. 24, 1901. All young men of 21 years of age, with certain exceptions, are obliged to serve. By the law of 1901 the army consists of 24 regiments of infantry, 12 regiments of chasseurs, 10 regiments of cavalry, 3 regiments of field artillery, 1 battery of mountain artillery, 2 regiments and 4 companies of garrison artillery, and 1 regiment of engineers. The duration of service is 12 years—3 with the active army, 5 in the first, and 4 in the second, reserve. The strength of the army was, in 1901, 33,068 men of all ranks, including municipal and reserve guards. There were 6,479 horses and mules. The effective war strength is about 111,137 men, 14,487 horses and mules, and 240 guns. There are maintained in the colonies 9,478 officers and men, besides native troops.

The navy in 1901 consisted of 1 old armored vessel, 5 protected cruisers (built and building), 2 modern third-class cruisers, 4 old third-class cruisers, 26 gunboats, and 45 torpedo boats; 2 coast-defense vessels are also building. The navy is officered by 2 vice-admirals, 11 rear-admirals, 35 captains, 42 lieutenant-captains, and a total of 4,360 men.

COMMERCE, SHIPPING, AND INTERNAL COMMUNICATION. Imports, in 1900, $61,000,000; exports, $33,015,000. The imports from the United States amounted to about 16 per cent of the whole. Wine, cork, and sardines were the chief exports.

The commercial navy of Portugal consisted, in 1898, of 47 steamers and 239 sailing-vessels.

Including coasters and vessels calling at different ports, there entered the ports of Portugal, the Azores, and Madeira, in 1897, 6,107 vessels, of 7,910,128 tons; and cleared 6,139 vessels of 7,896,639 tons.

The length of railways open for traffic in 1897 was 1,464 miles, of which 507 belonged to the government. Area of Portugal, with Madeira and the Azores, 35,843 sq. miles; pop. 5,049,729. R.W.C.

PORTUGUESE EAST AFRICA. See AFRICA, in these Supplements.

PORTUGUESE LANGUAGE. See PORTUGAL, Vol. XXII, p. 365.

PORTUGUESE LITERATURE. See PORTUGAL, Vol. XIX, pp. 570–574.

PORTUGUESE WEST AFRICA. See AFRICA, in these Supplements.

PORTULACA. See PURSLANE, Vol. XX, p. 122.

PORT WASHINGTON, a city and the capital of Ozaukee County, central eastern Wisconsin, 24 miles N. of Milwaukee, on Lake Michigan and the Chicago and North-Western railroad. It has a large tannery, chair and wooden-ware factories and several foundries. Population 1890, 1,659.

PORT WINE. See WINE, Vol. XXIV, p. 640

POSILLIPO. See NAPLES, Vol. XVII, p. 194

POSITIVE PRINTING PROCESSES. See PHOTOGRAPHY, in these Supplements.

POSITIVISM. See COMTE, Vol. VI, pp. 208–212; also POLITICAL ECONOMY, Vol. XIX, pp. 403, 404.

POSSE COMITATUS, literally, "the power of the county," being the legal phrase for which the word *posse* alone is commonly used. It refers to the body of men which the sheriff has power to summon to his aid when necessary for executing the law. R.W.C.

POSTAL SERVICE OF THE UNITED STATES. (For early statistics and description, see POST-OFFICE, Vol. XIX, pp. 595, 596; also see POST-OFFICE DEPARTMENT, in these Supplements.) The postal service was greatly improved during the ten years including 1886 and 1895. The development of the international service has been brought about by the growth of the individual state service. This growth has not been in the United States alone, but also in every country on the globe. The United States with its vast extent has presented a field for the development of the postal service on a large scale. The number of post-offices in the United States in 1895 was 70,064, while in 1890 there were 62,401 and in 1880, 42,989. Of 68,403 offices in 1893, 3,360 were Presidential; the remainder, of the fourth class. The total length of all mail routes in 1894 was 454,746 miles, and the gross revenue $76,983,128 and the expenditures $86,790,172. From a total business of 1,000 letters a day, which was the estimate of the Postmaster-General in 1789, it is estimated that the number has so increased that 8,000 pieces are handled each minute.

There are several branches of the postal service which deserve special description:

1. THE MONEY-ORDER SYSTEM, created by act of Congress approved May 17, 1864. It provides the public with the means of making small remittances of money by mail cheaply and safely. This is accomplished through the issue of orders by one postmaster upon another. These orders are issued upon written applications therefor, the purchaser of the order being required to deposit with his application the amount of money for which he desires the order to be made, in addition to the fee. After the order is delivered to the purchaser, he sends it to the payee. At the same time a duplicate slip is sent the postmaster upon whom the order is drawn. The latter obtains the amount called for in the order from the postmaster at the receiving office, upon presentation of the order.

Money orders are limited by law to $100, the fees for amounts up to that being (1895) as follows: For sums not exceeding $2.50, 3 cents; over $2.50 to $5, 5 cents; over $5 to $10, 8 cents; over $10 to $20, 10 cents; over $20 to $30, 12 cents; over $30 to $40, 15 cents; over $40 to $50, 18 cents; over $50 to $60, 20 cents; over $60 to $75, 25 cents; over $75 to $100, 30 cents. For international money orders, the rates are: For sums not exceeding $10, 10 cents; over $10 and not exceeding $20, 20 cents; over $20 and not exceeding $30, 30 cents; over $30 and not exceeding $40, 40 cents; over $40 and not exceeding $50, 50 cents; over $50 and not exceeding $60, 60 cents; over $60 and not exceeding $70, 70 cents;

over $70 and not exceeding $80, 80 cents; over $80 and not exceeding $90, 90 cents; over $90 and not exceeding $100, one dollar. The order is always upon a designated postmaster, and therefore can be paid by no other, and it is invalid if not presented within one year from its date. Postal notes, the issue of which was authorized in 1883, were withdrawn in 1894.

2. The Registry System was first authorized by act of Congress of March 3, 1855. It gives additional security to valuable matter in its passage through the mails. The means relied on for giving this security consists in the recording, or registering, of all matter presented for registration, the giving of receipts to the senders at the time of mailing, the receipting and careful handling of the matter by all persons through whose hands it passes throughout its journey, and the addressee's final acknowledgment of having received it. A letter registered may be traced from hand to hand until it gets to its destination, or, in case of loss or miscarriage, up to the official who is responsible for it. Registered matter is inclosed in large colored envelopes, termed "registered package envelopes." They may contain one or more letters to any one post-office. The condition of these envelopes must be indicated by the indorsements of all who handle them. A bill of lading or "registry bill" accompanies these envelopes, which bill, after verification, is returned by the receiving postmaster to the sending postmaster. A great part of the separate handling of registered matter has lately been obviated by the use of "through pouches" between prominent post-offices, the pouches being locked with the tell-tale locks, that can be opened only by the sending and receiving postmasters. All kinds of postal matter may be registered at the rate of eight cents for each package in addition to the regular rates of postage, to be fully prepaid by stamps. Each package must bear the name and address of the sender. Mail matter can be registered at all post-offices in the United States. The Post-Office Department is not by law liable for the loss of any registered or other mail matter.

3. The Free-Delivery System was authorized by act of Congress, March 3, 1863. Its function is to deliver letters and other mail-matter at the places designated in the addresses. This is done by carriers employed by the government. The same carriers also collect mail-matter from the street-boxes, wherein the letters are deposited by the senders. The term "free-delivery" is not correct, for while no direct charge is made for delivering matter by the carriers, there is an indirect charge, made by doubling the local or drop rate of postage on letters at all free-delivery offices. Thus, at an office where carrier delivery is not made, the drop rate on letters is one cent an ounce or fraction thereof; at a free-delivery office the drop rate is two cents—the difference being originally intended to maintain the system. Under the law passed by Congress affecting the free-delivery system, authority is given the Postmaster-General to establish it at any place having a population of 10,000, or where the gross revenue of the post-office for the preceding year shall have amounted to $10,000. The total number of free-delivery offices in existence on June 30, 1888, was 358. In 1889, 43 post-offices were enlarged to free-delivery offices, and, in 1890, 53 offices were made free-delivery offices.

4. The Special-Delivery System was authorized by act of Congress of March 3, 1885. Its function is to deliver mail matter immediately to the addressee, when it arrives at post-offices. Special messengers are employed for this service. At first this system was confined to places having a population of four thousand or more. But by a subsequent law it was extended to all post-offices. To secure special delivery the sender must affix to the letter, in addition to the postage, a large "special-delivery" stamp, which costs ten cents. Messengers are allowed eight cents for every special delivery. The government thus makes a profit of two cents on each letter. The amount of this profit is about $30,000 a year. At large post-offices permanent messengers are employed on special-delivery duty. At other offices the postmaster effects delivery by any practicable means.

5. The Dead-Letter Office has the function to restore to the owners letters and other mail matter that have failed of delivery. Everything is restored except printed matter of no apparent value or interest, such as advertisements, circulars, etc. If the matter bears upon it on the outside the name and address of the sender, it is returned to him direct by the receiving postmaster at the end of thirty days; if it bears a request to return within a given time, it is returned direct at the end of the time named. If it does not bear the name of the sender on the outside, it is advertised, and if not delivered it is retained in the post-office for thirty days, and finally sent to the Dead-Letter Office in Washington, where it is opened, if found necessary, and restored to the owner. Weekly returns of such matter are made by postmasters at the larger offices; monthly returns by all others. The registered matter is recorded, and promptly restored to the senders. Matter of which the ownership cannot be ascertained is held subject to reclamation. All foreign dead letters are returned without examination to the country of their origin. Much of the matter that reaches the Dead-Letter Office is never restored, especially if neither the sender nor addressee of the matter can be found, and if no inquiry concerning it is received, or if the writer of a letter has failed to sign his or her name, as it happens very frequently.

In 1890 about 5½ per cent of the whole number, or, in round numbers, 319,000, of all letters opened contained valuable inclosures, either of money, negotiable paper, postage-stamps or miscellaneous papers and articles. The money inclosures alone amounted to over forty thousand dollars, and those representing negotiable paper to over one million four hundred thousand dollars. There were nearly eleven thousand letters which contained lottery tickets, and nearly two hundred thousand contained pictures and papers of a character unfit for circulation. These were all destroyed.

Nearly three hundred thousand letters which contained inclosures were returned to the owners, and

about three and a quarter million pieces, on failure after every effort had been made to reach the owners, were destroyed. Parcels of merchandise unclaimed for two years are annually disposed of at auction.

6. The Transportation of the Mails is done by five general methods, namely: by railroads, by steamboats, by mail-messengers, by ocean steamers, and by what is known as "star" service. The pay for "railroad transportation" is prescribed by law of Congress. The companies are required to transport the mails on their fastest trains, and also to carry them to and fro between railroad stations and post-offices at their own expense, if the distance is not over one fourth of a mile. "Mail-messenger" service comprises the carrying of the mails between post-offices and railroad and steamboat stations where the distances are over one fourth of a mile; between one station and another of different railroads; between post-offices and their branches in large cities; and over routes not regularly established as post-routes. "Steamboat" service is usually contracted for four years at the lowest obtainable rates; while "ocean-steamship" service is let for periods of two years. The latter is confined to the foreign mails. The "star" service includes transportation by wagon, carriage, stage, horseback, or afoot. The routes are designated by a star in the book of routes at the department. This service is let every four years to the lowest bidder. Competition has brought the pay over the star routes down to low rates, in some cases too low to secure good service.

Postal Regulations. All mailable matter in the United States is divided in four classes:

The matter known as *First-class* includes letters, postal-cards and anything sealed or otherwise closed against inspection, or anything containing writing not allowed as an accompaniment to printed matter under class three. Rates of letter postage to any part of the United States, two cents per ounce or any fraction thereof. The same rate applies to letters at free-delivery offices, but at offices where there is no free delivery, letters for local transmission are to be paid for at the rate of one cent per ounce or fraction thereof. Postal-cards are carried for one cent, providing nothing be attached to them and nothing but the address be placed on the stamped side. Postage on all letters should be prepaid, but will be carried if one full rate be prepaid. Letter rates are charged on all productions by the typewriter and on all printed imitations of the typewriter. Letters will be returned to the sender free. There is no limit of weight for first-class matter. The direction on forwarded letters may be changed as many times as may be necessary to reach the persons addressed.

Second-class Matter includes all newspapers, periodicals or matter exclusively in print and regularly issued at stated intervals, as frequently as four times a year, from a known office of publication, to actual subscribers or news-agencies. Periodicals and reports of secret-society officers are included in this class, provided that they be issued not less than four times a year. Publishers who wish to avail themselves of this privilege are required to make formal application through the postmaster at the place of publication. Rates of postage to publishers, one cent a pound or fraction thereof, prepaid. Publications not having a legitimate list of subscribers and designed primarily for advertising or free circulation are excluded from the pound rate, and pay third-class rates. Special editions are excluded from the second-class rates, and issues in which space is given to the advertisement of some special firm, and the issue is circulated free in large numbers or a larger price than customary is to be charged. Publications sent to actual subscribers in the county of publication are to go free, unless mailed for local delivery at a letter-carrier office. Rates of postage on transient newspapers or periodicals, one cent for each four ounces or fraction thereof. Second-class matter will be entitled to special delivery when special-delivery ten-cent stamps are affixed in addition to the regular postage. Transient second-class matter must be so wrapped as to enable the postmaster to inspect it. Any writing other than the address and the sender's name and address subjects the matter to letter postage.

Third-class Matter includes printed books, engravings and other matter wholly in print, proof-sheets and manuscript copy accompanying the same. The rate on matter of this class is one cent for each two ounces or fraction thereof. Third-class matter must admit of inspection; must be fully prepaid, and no writing other than the address and return directions can be on the wrapper. The limit of weight is four pounds, except single books in separate packages, on which the weight is not limited. A simple manuscript dedication may appear in a book or other third-class matter.

Fourth-class Matter includes all mailable matter not included in the three preceding classes, which is so prepared for mailing as to be easily withdrawn from the wrapper and examined. It embraces merchandise, samples of all description, and coin or specie. Rate of postage, one cent for each ounce or fraction thereof (except seeds, bulbs, etc., the rate on which is one cent for each two ounces or fraction thereof). Articles of this class that are liable to injure or deface the mails, such as glass, sugar, nails, etc., must be first wrapped in a bag or open envelope and then secured in an outside box made of wood or metal. Poisons, inflammable articles, insects, etc., will not be forwarded. Admissible liquids can be mailed to the extent of four ounces, liquid measure. Limit of weight of fourth-class matter, excepting liquids, is four pounds.

POSTAL UNION, Universal. This is an association of states. The aim of this union is to form, for purposes of international and mail communication, *a single postal territory embracing the whole world*, with uniformity of postal charges and conditions of international exchange for all descriptions of correspondence.

The International Postal Convention, concluded at Berne, in October, 1874, went into operation on July 1, 1875. It began a new era in correspondence with the rest of the world. Nothing has contributed so much to a state of universal peace and amity, or to promote civilization and to disseminate truth and correct principles. By means of the efficient service of this union it is estimated that a letter can be sent around the world in 44 days. This is based upon an experiment to test the rapidity of the mail transit, conducted in 1891. The mail was timed from its departure from Yokohama, Japan, to its return there, having traversed the Pacific Ocean, North America, Atlantic Ocean, Europe, Suez Canal, Indian Ocean, and the Pacific Ocean again.

The Original Members. The countries forming the Postal Union on June 30, 1876, were as follows: The United States, Austria-Hungary, Belgium, Denmark (including Iceland and the Faroe Islands), Egypt, France (including Algeria), Germany (including the Island of Heligoland), Great Britain and Ireland (including Gibraltar, Malta and the dependencies of Malta), Greece, Italy, Luxemburg, Montenegro, Netherlands, Norway, Portugal (including the Island of Madeira and the Azores), Roumania, Russia (including the Grand

Duchy of Finland), Servia, Spain (including the Balearic Isles, the Canary Islands, the Spanish possessions on the North Coast of Africa and the postal establishments of Spain on the West Coast of Morocco), Sweden, Switzerland, and Turkey.

ADDITIONAL MEMBERS. The following table shows the countries and colonies which were added, from 1876 to 1881, to the original postal-union formed by the treaty concluded at Berne, Oct. 9, 1874, and the dates upon which the said countries and colonies joined the union:

British India	July	1, 1876
French Colonies (except Bassam and Assinie)	July	1, 1876
Bermuda, Islands	April	1, 1877
Ceylon	April	1, 1877
Guiana (British)	April	1, 1877
Hong Kong	April	1, 1877
Jamaica	April	1, 1877
Labuan	April	1, 1877
Mauritius and dependencies	April	1, 1877
Straits Settlements	April	1, 1877
Trinidad	April	1, 1877
Tunis, Italian postoffice at	April	1, 1877
Netherlands Colonies in Asia, Oceania and America	May	1, 1877
Spanish Colonies in Africa, Asia, Oceania and America	May	1, 1877
Tunis, French post-office at	May	1, 1877
Tangier, French post-office at	May	1, 1877
Japan	June	1, 1877
Portuguese Colonies	June	1, 1877
Brazil	July	1, 1877
Hong Kong, post-offices at Canton, Swatow, Amoy, Foo Chow, Ningpo, Shanghai and Hankow (China)	Aug.	18, 1877
Danish Colonies of St. Thomas, St. Croix and St. Jean	Sept.	1, 1877
Greenland	Sept.	1, 1877
Persia	Sept.	1, 1877
Shanghai, French post-office at	Oct.	1, 1877
Cambodia, French post-office at	Jan.	1, 1878
Tonquin, French post-office at	Jan.	1, 1878
Argentine Republic	April	1, 1878
Hong Kong, post-offices at Hai-phung and Hainoi (Tonquin)	April	23, 1878
Canada	Aug.	1, 1878
Sudan	Aug.	14, 1878
Cyprus, Island of	Dec.	20, 1878
British Colonies on the west coast of Africa,	Jan.	1, 1879
Falkland Islands	Jan.	1, 1879
Honduras (British)	Jan.	1, 1879
Newfoundland	Jan.	1, 1879
Andorra, Republic of	April	1, 1879
Ionian Isles	April	1, 1879
Liberia	April	1, 1879
Lichtenstein, Principality of	April	1, 1879
Mexico	April	1, 1879
Monaco, Principality of	April	1, 1879
Nubia	April	1, 1879
Peru	April	1, 1879
San Marino, Republic of	April	1, 1879
Tripoli, Italian post-office at	April	1, 1879
Bulgaria	July	1, 1879
Leeward Islands (British)	July	1, 1879
Honduras, Republic of	Oct.	1, 1879
Venezuela	Jan.	1, 1880
Bahama Islands	July	1, 1880
Ecuador	July	1, 1880
French Colonies of Grand Bassam and Assinie (dependencies of Gaboon)	July	1, 1880
Uruguay	July	1, 1880
Dominica, Republic of	Oct.	1, 1880
Chile, Republic of	April	1, 1881
Colombia, United States of	July	1, 1881
Hayti, Republic of	July	1, 1881
Paraguay, Republic of	July	1, 1881
Guatemala	Aug.	1, 1881

The principal countries and colonies of postal and commercial importance not embraced in the union in 1890 were the Central and South American states of Nicaragua, Costa Rica, Bolivia, the Sandwich Islands, New Zealand and the British Colonies in Australia. The advantage of belonging to the union had, however, been by that time so thoroughly demonstrated that measures for entering it were taken by one country after another, until, in January, 1895, when New Zealand entered the compact, all the countries and colonies of the world maintaining organized postal services had become members of the Universal Postal Union, thus realizing the grand idea of its founders.

On Feb. 4, 1885, a congress composed of members delegated by the states of the postal union met at Lisbon, Portugal, and adopted a new convention, which went into effect on April 1, 1886, and which is now in force. Under the postal union an international bureau is maintained at Berne, Switzerland, through which correspondence is carried on between the several countries of the union relative to its common business, to the settlement of disagreements between two or more countries, to the tabulation and publication of statistics, and to all other matters that may be of interest or benefit to the postal world. The rates of international postage, as now fixed by the convention, are as follows: Letter, five cents a half-ounce if prepaid, and double this rate (to be collected on delivery of the matter) if not prepaid; postal-cards, two cents each; printed matter, commercial papers and samples of merchandise, one cent for each two ounces if prepaid, and double this rate if not prepaid.

POSTEL, KARL ANTOINE, author; born in Pappitz, near Zriam, Moravia, in 1794. He was at first a monk, but fled from his convent and took refuge in the United States, where he dwelt from 1822 to 1830 and became in 1829 associate editor of the *Courier des Etats Unis*. He is best known under the name of Charles Sealsfield, his pseudonym as an author. About 1831 he settled in the canton of Soleure, Switzerland, where he became the originator of a kind of exotic novel, which created a sensation in Germany. He wrote in English *Tokeah, or the White Rose;* in German, *Sketches of Trans-Atlantic Travels; Pictures of Life from Both Hemispheres*, and *South and North;* also *The Legitimist and the Republican*, a novel, etc. Several of his novels were published under the pen-name of Charles Siddons. He died in Soleure in 1864. G.J.H.

POST-OFFICE DEPARTMENT, THE UNITED STATES. The United States postal service is under the control of the Postmaster-General, who is, and has been since the administration of President Jackson, a member of the Cabinet. Under him are the first, second and third assistant postmasters-general, the superintendent of the money-order system, the general superintendent of the railway mail service, the superintendent of foreign mails, the chief post-office inspector and the superintendent of the dead-letter office, each of whom has under him a corps of clerks and other employees at the seat of government.

Beside these there is an officer of the Treasury Department, known as the Auditor of the Treasury for the Post-Office Department, who has a close and important connection with the postal service. The several classes of postal officials outside of the department proper at Washington are postmasters and their clerks, letter-carriers, railway postal clerks, mail-messengers, and mail-contractors. The Postmaster-General appoints all officers and employees of the department, except the four assistant postmasters-general, who are appointed by the President; appoints all postmasters whose compensation does not exceed $1,000; makes postal treaties with foreign governments, by and with the consent of the President; awards contracts; directs the foreign mail service; and exercises a general supervisory power. The first assistant postmaster-general has charge of the appointment and qualification of postmasters, the establishment of postoffices, the apportionment among them of the appropriations for clerk-hire, rent, light and fuel, the supply of stationery and the operations of the free-delivery system. The second assistant postmaster-general has control over the transportation of the mails, the making of contracts therefor, the ascertainment of the pay of railroads for mail service, and the supply of mail-bags, locks and keys. The duty of the third assistant postmaster-general takes in all the business relating to the classification of mail-matter and the rates of postage, the collection and deposit of the postal revenues, the payment of postal indebtedness, the control of the registry and special-delivery systems, and the issue to postmasters of postage-stamps, stamped envelopes and other forms of stamped paper. The duty of the auditor is to audit and settle quarterly the accounts of postmasters and other postal officers, and to certify for payment the several classes of postal indebtedness. The duties of the other officers named are indicated by their designations.

POSTMASTERS GENERAL AND TERM OF SERVICE.

Years of Beginning and Ending of Term Are Given.

Samuel Osgood (Mass.)	1789–1791	John A. J. Cresswell (Md.)	1869–1874
Tim'y Pickering (Mass.)	1791–1795	Jas. W. Marshall (Va.)	1874–1874
Joseph Habersham (Ga.)	1795–1801	Marshall Jewell (Ct.)	1874–1876
Gideon Granger (Ct.)	1801–1814	James N. Tyner (Ind.)	1876–1877
Return J. Meigs, Jr. (O.)	1814–1823	David McK. Key (Tenn.)	1877–1880
John McLean (Ohio)	1823–1829	Horace Maynard (Tenn.)	1880–1881
William T. Barry (Ky.)	1829–1835	Thomas L. James (N. Y.)	1881–1881
Amos Kendall (Ky.)	1835–1840	Timothy O. Howe (Wis.)	1881–1883
John M. Niles (Ct.)	1840–1841	W. Q. Gresham (Ind.)	1883–1884
Francis Granger (N. Y.)	1841–1841	Frank Hatton (Ia.)	1884–1885
Chas. A. Wickliffe (Ky.)	1841–1845	William F. Vilas (Wis.)	1885–1888
Cave Johnson (Tenn.)	1845–1849	Don M. Dickinson (Mich.)	1888–1889
Jacob Collamer (Vt.)	1849–1850	John Wanamaker (Pa.)	1889–1893
Nathan K. Hall (N. Y.)	1850–1852	Wilson S. Bissell (N. Y.)	1893–1895
Samuel D. Hubbard (Ct.)	1852–1853	Wm. L. Wilson (W. Va.)	1895–1897
James Campbell (Pa.)	1853–1857	James A. Gary (Md.)	1897–1898
Aaron V. Brown (Tenn.)	1857–1859	Charles E. Smith (Pa.)	1898–1901
Joseph Holt (Ky.)	1859–1861	Henry C. Payne (Wis.)	1901–1904
Horatio King (Me.)	1861–1861	Robert J. Wynne (Pa.)	1904–1905
Montgomery Blair (Md.)	1861–1864	G. B. Cortelyou (N. Y.)	1905–
William Dennison (O.)	1864–1866		
Alexander W. Randall (Wis.)	1866–1869		

POTASH. Ordinary commercial potash consists of the crude carbonate and hydrate of potash. It is chiefly obtained from wood-ashes, which contain it in abundance. The method pursued in the United States is to burn large heaps of wood to ashes. These are then placed in tubs made from barrels sawn in half, and with perforated false bottoms. About five per cent of lime is added, and the ashes are leached by successive applications of water, each of which is allowed to stand for an hour or two. The water is then drawn off from the bottom, the first draining being taken to the evaporating-pans, while the succeeding portions are kept to use on fresh ashes. Broad, shallow iron pans are used, in which the liquid is boiled till it becomes syrupy. It grows solid on cooling. The substance thus obtained is intensely alkaline. When purified by heating, becomes of a white, bluish or pearly cast, and is known as pearlash. The lime used in its preparation acts to decompose the sulphate of potash, which forms one of the salts of the ashes and frees the potash. Potash exists to the amount of 12 per cent in the mineral glauconite of the greensand deposits of New Jersey. This is more easily decomposed than feldspar, and is capable of yielding large quantities of potash. The greater cheapness of soda has enabled it to replace potash in most cases where an alkali is needed, but a steady demand exists for potash from its special adaptation to certain uses. Its principal uses are in the manufacture of soft-soap, of several important salts of potassium, and as a fertilizer. It is also used in the manufacture of glass, some of the best and most costly glasses now made, such as Bohemian white and English flint, being potash glasses. See MANURE, Vol. XV, p. 516; and POTASSIUM, Vol. XIX, pp. 605–611.

POTATO BUG OR BEETLE. See COLEOPTERA, Vol. VI, p. 121.

POTATO CROPS IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

POTEKHIN, ALEKSEI ANTIPOVICH, a Russian writer; born in Kineshma, Kostroma, Russia, July 1, 1829. He wrote a number of novels and dramas. Some of his works have been condemned by the press censors. The reason for this is his faithful portrayal of the inner home and working life of the Russian peasantry. Among his dramas are *The Voice of the People, not the Voice of God* (1853) and *Tinsel* (1870); and the best known of his novels are *The Peasant Woman; For Money* (1879); and *Village Leeches* (1880).

POTENTIAL, ELECTRICAL. See ELECTRICITY, Vol. VIII, pp. 22–34; and ELECTRICITY, §§ 23, 25, 27, 28, in these Supplements.

POTENTILLA. See HORTICULTURE, Vol. XII, p. 267; and BLOOD-ROOT, in these Supplements.

POTGIETER, EVERHARD JOHANNES. See HOLLAND, Vol. XII, p. 101.

POT-HOLE. See GEOLOGY, Vol. X, p. 245.

POTSDAM, a village of St. Lawrence County, New York, in the northern part of the state, 158 miles north by west of Albany. It is on the Rac-

quette River, and is reached by the Rome, Watertown and Ogdensburg railroad. The river affords it fine water power for its industries, which include lumber mills, iron foundries, machine shops and agricultural implement factories. The river also serves as a transportation route for the timber which is brought down from the Adirondack Mountains. Potsdam is also the site of the quarries whence the fine Potsdam sandstone is obtained. Its population in 1900 was 3,843. W.F.J.

POTSDAM SANDSTONE. See GEOLOGY, Vol. X, p. 293.

POT-STONE. See MINERALOGY, Vol. XVI, p. 432.

POTT, AUGUST FRIEDRICH, a German philologist; born at Nettelrede, Hanover, Nov. 14, 1802; from 1825–27 teacher at the College of Celle, and professor of philology at Halle from 1833 to the time of his death, July 5, 1887. He established his reputation by *Etymologische Forschungen* (6 vols., 1859–76), a prominent work on Indo-Germanic linguistics. He also wrote *De Borussico-Lithuanicæ tam in Slavicis Quam Letticis Linguis Principatu* (1837–41). G.A.S.

POTT, PERCIVAL, a British surgeon; born in London, England, in 1713. He was a specialist in the diseases of the spine, and "Pott's disease" received its name from his discovery of the causes of curvature of the spine. For 38 years he was a chief surgeon at St. Bartholomew's Hospital, London. He published a number of treatises, among them *Nature and Consequences of Wounds and Contusions of the Head* (1760); and *That Kind of Palsy of the Limbs which Attends Curvature of the Spine* (1779). He died Dec. 22, 1788.

POTTAWATOMIES, a tribe of North American Indians whose family relationships are given under *Algonquin*, in INDIANS, Vol. XII, p. 867, and who are further described on page 871. According to the United States government report for 1895 the Pottawatomies in that year numbered about 1,675, who were distributed on reservations as follows: In Kansas, 565; in Michigan, 77; in Oklahoma, at the Sac and Fox Agency, 753; and in Wisconsin, 280.

POTTER, ALONZO, an American clergyman; born in Beekman (now La Grange), Dutchess County, N. Y., July 10, 1800. He graduated at Union College in 1818, became a tutor there in 1819, and was elected professor of mathematics and natural philosophy in 1821. He studied for the church, and was ordained deacon in April, 1821, and priest in August, 1824. In 1825 he was elected president of Geneva (now Hobart) College, N. Y., but declined the post. He was rector of St. Paul's Church, Boston, from 1826 to 1831, in which year he became vice-president and professor of moral philosophy in Union College. He received the degree of doctor of divinity from Harvard and Gambier Colleges, and in 1846 that of doctor of laws from Union College. Having been chosen bishop of Pennsylvania, he was consecrated Sept. 23, 1845. He has published *The Principles of Science Applied to the Domestic and Mechanic Arts* (1841); *Political Economy, Its Objects, Uses, and Principles Considered* (1841); *Handbook for Readers and Students* (1847); *Discourses, Charges, and Addresses* (1858); and, in conjunction with George B. Emerson, *The School and Schoolmaster* (1844). He died in San Francisco, Cal., July 4, 1865. E.E.T.

POTTER, ELIPHALET NOTT, an American educator; born in Schenectady, N. Y., Sept. 20, 1836; the son of Alonzo Potter (q. v.). He graduated at Union College, and entered the Protestant Episcopal ministry in 1862. He became professor at Lehigh University; later president of Union College, and, after that, chancellor of Union University, which he founded. Afterward he was president of Hobart College, at Geneva, N. Y., until 1897, when he became president of the Cosmopolitan University, an institution designed to give university instruction by means of correspondence courses. He died in Mexico City, Mex., Feb. 6, 1901. E.E.T.

POTTER, GEORGE, a British labor-unionist; born in Kenilworth, Warwickshire, England, in 1832. He learned the carpenter's trade, and afterward became a joiner. He became prominent in labor agitations; was an officer of the nine-hours movement committee in 1857, and was in charge of the building-trades strike of 1859. He founded and edited the *Beehive*, afterwards the *Industrial Review*. As president of the London Workingmen's Association he was instrumental in the gathering of the trades-union congress in 1868. He was a candidate for election to Parliament in 1874, in 1886 and in 1892, but was defeated each time. He was a contributor to the *Contemporary Review*. He died in London, June 3, 1893.

POTTER, HENRY CODMAN, an American clergyman; born in Schenectady, N. Y., May 25, 1835, son of Bishop Alonzo Potter (q. v.). He graduated at the Theological Seminary of Virginia, and took deacon's orders in 1857, and was ordained priest in 1858. He filled pastorates at Christ Church, Greensburg, Pa., 1857–58; and at St. John's Church, Troy, N. Y., 1859–66; and was later assistant at Trinity Church, Boston, Mass., and rector of Grace Church, New York. He was secretary to the House of Bishops, 1863–83, and coadjutor to his uncle, Horatio Potter, bishop of New York, 1883–87; and has been bishop of New York since the latter date. He takes an active interest in social reform. E.E.T.

BISHOP POTTER.

POTTER, HORATIO, an American clergyman; born in Beekman (now La Grange), N. Y., Feb. 9, 1802. He graduated at Union College in 1826, and was ordained priest in the Protestant Episcopal Church in 1828. He was professor of

mathematics and natural philosophy in Washington (now Trinity) College, Hartford, Conn., 1828–33, in which latter year he became rector of St. Peter's Church, Albany. He was consecrated provisional bishop of New York, Nov. 22, 1854, and on April 30, 1861, became bishop of the diocese. He died in New York, Jan. 2, 1887. E.E.T.

POTTER, William James, clergyman; born in North Dartmouth, Mass., Feb. 1, 1830. He graduated at Harvard in 1854; studied at the Harvard Divinity School in 1856–57, and was ordained a Unitarian pastor at New Bedford, Mass., in 1859, preaching there till his death. Drafted into the army in 1863 he served for a year in the hospitals about Washington. He died in Boston, Dec. 21, 1893. G.J.H.

POTTERIES, THE, a popular name for one of the busiest manufacturing centers in England, situated in the northwestern portion of Staffordshire, where the celebrated English earthenware and porcelain are made. The Potteries occupies the upper valley of the river Trent for a distance of about ten miles, and is rich in iron and coal. The clay and other materials used in the manufacture of pottery is brought from a distance. The district contains the towns of Stoke-upon-Trent, Hanley, Etruria, Burslem, Longton, Kidsgrove, Silverdale, Newcastle-under-Lyme, and several other villages, the population of which has gradually increased to such an extent that the district may now be described as one large and scattered town, with upward of 300,000 inhabitants. The importance of the industry is largely due to the enterprise of Josiah Wedgwood, Minton and Copeland. Steam street-railroads traverse the entire district, and a stipendiary police magistrate has been appointed to try petty offenders.

POTTERY INDUSTRY IN THE UNITED STATES. The development of the pottery industry in the United States during the last 16 years has been chiefly along the lines of improved quality, methods and workmanship. While the value of the annual production has increased to some extent, it has not gained to any material advantage, since domestic manufacturers are to-day supplying considerably less than 50 per cent of the goods consumed in this country, where in 1880 they were supplying over 40 per cent. The discrepancy between the advance made commercially and that made artistically may fairly be attributed to a governmental policy which has failed to recognize the peculiar susceptibility of this branch of manufacturing art to unforeseen and unavoidable accidents. That, in the face of obstacles and adversity, manufactories of Ceramic Art (q.v., in these Supplements), in many respects as excellent as any in the world, should have been built up within the short space of twenty years, shows how determined has been the attempt to establish the industry in its highest form. No country is richer in the fi e clays for either porcelain and china, earthen o stone wares, and nowhere are the materials, feldspar and flint, found in greater abundance or purity than in the United States. With every natural advantage and the skill born of long research and experiment, the industry is handicapped solely by the fact that labor here must be and is better paid than anywhere else in the world. As labor constitutes nearly 90 per cent of the entire cost of pottery production, and as the wages of the workers in the American factory are 125 per cent more than those paid the English operative, more than double those paid in France and at least three times those paid in Germany, the absolute inadequacy of a tariff of 30 per cent becomes apparent.

Pottery in the United States to-day, as yesterday and as one hundred years ago, is made in the same way—by the hand of the potter molding and turning the plastic clay on his wheel, and firing the finished shape in the kilns. With the exception of machines for mixing clay, and the substitution of a power-driven wheel for the old "kick" wheel, machinery has never been and probably can never be introduced to any extent into the practice of potting. Methods have improved, knowledge broadened and treatments perfected and reduced to exactitudes, but never can the molding hand of the potter himself be replaced by the unyielding precision of machinery.

With these facts, which are peculiar to this single industry, given due consideration and weight, the year 1879, which marked the passing of the gold premium, may fairly be said to have inaugurated the second period in the development of the American pottery industry. The first period may be dated from 1861, and nothing but the long continuation of the gold premium sustaining an insufficient tariff could have enabled the potteries to emerge successful from the vicissitudes common to all new enterprises. That they did so, and that giant strides were made toward permanent establishment, is shown in the fact that by 1880 nearly $5,000,000 worth of white ware was being turned out annually where prior to 1861 there was little or none, the production being chiefly the yellow and Rockingham wares with the cheap earthenwares, flower-pots, drain-pipes and stoneware. The value of the entire annual production of the factories of the United States in 1880 was nearly $8,000,000, or two and three fourths times as much as that of twenty years before, while the capital invested was over three times as great. The industry had already centered at the two great points, Trenton, New Jersey, and East Liverpool, Ohio, where it still remains, there being also important potteries in Cincinnati, Wheeling, West Virginia, Baltimore, New York and Boston. The fine china clay or kaolin had been found and developed in many sections, notably in Pennsylvania, New Jersey, Delaware, Carolinas, Missouri and various southern states, together with other fine clays in Indiana, Ohio and Illinois. Maine was producing large quantities of the finest feldspar annually, and the great Maryland flint district of Harford County was well opened up. All these branches

were employing thousands of workmen, and their plants for the proper preparation of the raw material represented a capitalization of many thousands of dollars

The potteries themselves had begun to turn their attention to the making of finer goods and decorated wares. The thick, heavy earthenware or crockery of 1880 has been gradually replaced by the thin, semivitrified light and shapely wares of to-day. "Crazing" or crackling of the glazes has been done away with in so far as is possible in any commercial wares, and the more refractory materials common to this country have resulted in a tougher and more serviceable grade of goods than those made abroad. In sanitary goods great advances have been made as well, this branch of the pottery industry having grown to much greater prominence relatively than any other since 1880. The finest procelain bathtubs are now made in several of the American factories, and knobs, druggists' sundries and other varieties of china fixings are produced in large quantities annually. In the main factories of these latter goods, machinery has been introduced to some extent, but the results are not of sufficient importance to modify the general statement previously made in this regard.

The number of potteries engaged in making ware for domestic uses, and exclusive of those making red flower-pots, common earthenware and drain pipes, terra cotta, etc., was, in 1894, 102, and of these several have since closed and many are running short time. Labor troubles as prolonged and bitter as have been known in any branch of industry have hurt the potteries greatly, and the last great general strike of 1893, lasting over six months and assuming political complications inimical to the industry, very nearly prostrated it. Followed as it was by sweeping tariff reductions, the potteries have never fully recovered, and the depression existing to-day is widespread and great. In a single year, that of 1893, the value of the annual production fell off thirty per cent, and at the present time ten million dollars is a generous valuation of this yearly output. In the face of this, the importations have steadily increased, and since 1885 there has been but one year, that of 1894, in which a large advance was not noted. In decorated goods especially has this excessive importation been most marked, the cheap female labor of the continent allowing the foreign manufacturer an advantage too great to overcome.

During all this time that the American potter had been in competition with the foreign manufacturer, the price of goods has steadily declined, and to-day $100 will buy as much as $160 would have bought before protection, as given by the gold premium, first permitted the establishment of extensive works in this country. Nor is the difference in price the only advantage gained; the character and quality of the product itself has improved to an almost incredible extent, and hundreds of thousands of dollars are saved every year to the consumer. The potters themselves have undertaken a great work, and it is a noteworthy fact concerning their industry that the value of production cannot exceed to any extent the capital employed. Labor in the goods and the material leaves but a 10-per-cent margin, from which must come the profit and the wear and tear.

The statistics concerning the potteries as given in the United States census reports for 1880 are as follows: Number of establishments, 686; capital, $6,380,610; production, $7,943,229. Of these 686 potteries, only 55, according to private and reliable authority, were engaged in the manufacture of white ware, and only 4 of these devoted to the manufacture of porcelain or fine china.

The figures for 1890 are more comprehensive, embracing all manufactures of "clay and pottery." Under such classification the figures for 1880 would read: Number of establishments, 752; capital, $7,366,323; production, $8,977,333. For 1890 the same industries return as follows: Number of establishments, 707; capital, $26,127,104; production, $22,057,090. As already stated, 102 of these establishments are potteries proper, engaged in the making of wares for domestic purposes. The shrinkage in the number of establishments and increase of capitalization shown by the complete figures follows the course observed to have been taken by so many industries during the decade, and is the result of concentration and the closing of many of the smaller shops. In the pottery industry there is one great trust operating to-day, but it confines itself largely to sanitary ware, and the industry as a whole still remains in the hands of individual concerns.

W. D. Willes.

POTTO. See Lemur, Vol. XIV, p. 444.

POTT'S DISEASE OF THE SPINE, a vertebral disease first described by Dr. Percival Pott (q. v., in these Supplements). It is otherwise known as "spinal caries." In this disease inflammation of the vertebræ and adjoining cartilages is followed by partial and sometimes total paralysis of the lower extremities. Tubercles form upon the diseased parts, and disintegration of the vertebræ results. Spinous processes project visibly beyond the rest, and form a curvature or hump such as is seen in some hunchbacks. Abscesses are formed, and in some instances the pus permeates the adjacent muscles. The treatment of a person suffering from this disease is the application of counteracting blisters and keeping the patient quiet, usually in a horizontal position. The disease is more often seen in young persons than in adults.

POTTSTOWN, a borough of Montgomery County, Pennsylvania, in the southeastern part of the state, 30 miles northwest of Philadelphia; is an important point in the Schuylkill Valley coal and iron region, and has also great dairying interests. Its population in 1900 was 13,696. See in Vol. XIX, p. 664. W.F.J.

POTTSVILLE, a borough and the county seat of Schuylkill County, Pennsylvania, lies in the

heart of the coal region of the upper Schuylkill Valley, and is steadily growing in industrial importance. It is reached by the Lehigh Valley, the Philadelphia and Reading, the Pennsylvania, and the People's railroads, and is the center of a great system of electric lines connecting it with neighboring cities and towns. Its population in 1900 was 15,710. W.F.J.

POUCHED RAT OR GOPHER. See MAMMALIA, Vol. XV, p. 421.

POUGHKEEPSIE, a city of New York. The Hudson is here spanned by an important railroad bridge of masonry, steel and iron (finished in 1889); the structure rests on six piers—four in the channel—and is 3,094 feet in length, from anchorage to anchorage, or including the approaching viaducts, nearly 7,100 feet. Over three spans are cantilevers, with arms of 160 feet. Its industries lately established include a blast-furnace, rolling-mill, and silk, clothing and carriage factories. It has several libraries and numerous educational institutions. Vassar College (q.v.), Lyndon Hall (for girls, 195 pupils), Poughkeepsie Military Academy (35 pupils), Riverview Military Academy (160 pupils), Quincy School (co-educational, 55 pupils), and Eastman National Business College (over 950 students). It has numerous handsome buildings, including some fine residences, and is supplied with an excellent water system, sewers and street-lights. Population 1890, 22,206; 1900, 24,029. See also POUGHKEEPSIE, Vol. XIX, p. 664.

POULSON, ZACHARIAH, publisher, one of the pioneers of the publishing trade and of journalism in America, was born in Philadelphia on September 5, 1761, of Danish parentage, and learned the printer's art in the office of Christopher Sower, who published the first German edition of the Bible in America. He was for many years official printer to the state of Pennsylvania. In October, 1800, he began the publication of the first daily paper in America, the *American Daily Advertiser*, and edited it until 1839, when it was discontinued. He was the publisher of a number of historical books, of *Poulson's Almanac*, and of the philosophical works of William de Braw. He was for many years librarian, treasurer and a director of the Philadelphia Library Company, and was interested in various other public institutions and benevolent enterprises. He died in Philadelphia on July 31, 1844. W.F.J.

POULTNEY, a town of Rutland County, Vermont, 14 miles W.S.W. of Rutland, on the Delaware and Hudson railroad, and on the Poultney River. The surrounding country is well adapted for pasturage, and is diversified with numerous picturesque lakes and forests of oak, sugar-maple, pine, beech and elm trees. It contains quarries and manufactories of slate, and several foundries, a machine-shop and mills. Population 1890, 3,031; 1900, 3,108.

POULTON, EDWARD BAGNALL, a British zoölogist; born in Reading, England, Jan. 27, 1856. He was graduated at Oxford in 1876, and was a demonstrator of biology in the University Museum laboratory. He was lecturer in natural science in Keble and Jesus Colleges, Oxford, from 1880 to 1889, and in 1893 became professor of zoölogy in the Hope professorship, Oxford. He published a large number of treatises, among them *The Colors of Animals, Their Meaning and Use* (1890), and *Mimicry in the Animal Kingdom* (1890).

POULTRY AND EGGS IN THE UNITED STATES. See AGRICULTURE, in these Supplements.

POUND-NET, a net used in fishing, the half of which is set in the form of a square inclosure similar to the pound or municipal corral for strayed animals in use in some American towns. The net proper is a long, straight stretch which leads the fish into the pound, and which is called the leader. These leaders vary in length from 500 to 1,500 feet, and are set with one end attached to the shore and the pound out in the deeper water.

POUND STERLING. See DECIMAL COINAGE, Vol. VII, p. 19; and MONEY, Vol. XVI, pp. 756, 760.

POUYER-QUERTIER, AUGUSTIN THOMAS, French statesman; born Sept. 3, 1820, in Estouteville-en-Caux. He engaged in manufacturing, and acquired wealth. He was a member of the Corps Legislatif in 1857–63; president of the Conseil General, of the Rouen Chamber of Commerce, and a director of the Bank of France. He was elected to the Chamber of Deputies in 1869, and was made Minister of Finance. The Alsace-Lorraine negotiations were in his charge, and to him belongs the credit of the placing of the first loan of $500,000,000 in 1871. He was chosen an officer of the Legion of Honor and a member of the Senate. Died at Rouen, April 2, 1891.

POWDERLY, TERENCE VINCENT, an American labor-organizer, born in Carbondale, Pennsylvania, Jan. 22, 1849. At the age of 12 he began tending switch on the Delaware and Hudson River railroad, and at 19 years of age was at Scranton working in a machine-shop. He became secretary of the Machinists' and Blacksmiths' Union there, and remained so till 1880. In 1874 he was a delegate to the International Union at Louisville, Kentucky. Returning to Scranton, he joined the Knights of Labor, and was made secretary of the district assembly. He was then foreman in locomotive works. In 1877 he was elected mayor of Scranton, and re-elected in 1878. In 1879 the Knights of Labor at their convention in Chicago elected him as General Master Workman; in 1893 he was succeeded by James R. Sovereign. Mr. Powderly urged upon the Knights of Labor the abolition of the oaths and the removal of the obligation of secrecy, which demand was finally acceded to. Was appointed Commissioner General of Immigration in 1897 by President McKinley.

POWELL, JOHN WESLEY, an American geologist; born in Mt. Morris, N. Y., March 24, 1834. He attended schools in Ohio, Wisconsin, and Illinois, and spent two years each at Oberlin

(Ohio) and Wheaton (Ill.) colleges, and at the Illinois Wesleyan University, where he took the degrees of Master of Arts and Doctor of Philosophy. He served throughout the Civil war, reaching the rank of major, and losing an arm at Shiloh. In 1869 he explored the Grand Cañon of the Colorado, and in 1879 was appointed director of the United States Bureau of Ethnology. In 1880 he became director of the United States Geological Survey, but resigned that office in 1894, retaining the former. He became a member of the National Academy of Sciences in 1880, and was connected with many other scientific bodies. He was the author of *Explorations of the Colorado River; Report on Geology of the Uinta Mountains; Report on Arid Regions of the United States; Introduction to the Study of Indian Languages; Studies in Sociology; Cañons of the Colorado; Truth and Error* (1898). He received the honorary degree of Doctor of Laws from Columbian University, Washington, in 1882, from Harvard University in 1886, from Illinois College in 1889; and that of Doctor of Philosophy from Heidelberg University, Germany, in 1886. He died in Haven, Me., Sept. 23, 1902.

J. W. POWELL.

E.E.T.

POWER, Tyrone, an Irish actor; born in County Waterford, Ireland, Nov. 2, 1797. He made his *début* in Cardiff as Romeo, and played for several years in provincial theatres. In 1824 he scored his first great success in London as Paddy O'Halloran, and thereafter devoted himself exclusively to the delineation of Irish character in such parts as Rory O'More, Phelim O'Flannigan, etc. In 1833 and 1840 he made successful tours in North America, and on March 11, 1841, he sailed from New York for England on the steamship *President*, which was never afterward heard from. E.E.T.

POWER OF ATTORNEY. See Attorney, Vol. III, p. 55.

POWHATAN (1550–1618). See Smith, Vol. XXII, p. 185.

POWNAL, a village of Bennington County, southwestern Vermont, on the Hoosac River, and on the Fitchburg railroad, nine miles S. of Bennington. It contains the Rural Home School for boys, and a manufactory of cotton and woolen goods. In the township is the hamlet of North Pownal. Population of township 1900, 1,976.

POWNALL, Thomas, colonial governor; born in Lincoln, England, in 1720; came to America in 1753 as private secretary to Governor Osborne of New York; was made lieutenant-governor of New Jersey in 1755, and governor of Massachusetts in 1756. He was appointed governor of South Carolina in 1760, but did not accept the office. In 1768 he was elected to Parliament, in which he showed himself a strong friend of the Americans. He retired from Parliament in 1780, having been the first member to bring in a bill for peace with the colonies. He was a man of much learning and an active writer, publishing *Principles of Polity; Memorial to the Sovereigns of America; State of Affairs between the Old and New World*, and other works. He died in Bath, England, Feb. 25, 1805. G.J.H.

POYNTER, Edward John, a British artist; born in Paris, March 20, 1836; the son of Ambrose Poynter, the architect, and great-grandson of Thomas Banks, R.A., sculptor. He received his education at Westminster school, Brighton College, and Ipswich grammar-school; and studied art in the English schools. On account of delicate health he was sent for the winter of 1852–53 to Madeira, and it was during his stay there that he developed an earnest desire to become an artist. Next winter he was in Rome, where he made the friendship of Frederick Leighton, the future president of the Royal Academy, and who shared his studio in Rome with the young enthusiast. In 1856 Poynter went to Paris, where he studied at l'École des Beaux-Arts, and under Gleyre. In 1859 he exhibited at the British Institution his two Italian *Pifferari*. In 1860 he returned to London, and the following year exhibited at the Royal Academy *Alla Veneziana*. Some of his early work in London consisted of making illustrations for *Once a Week*, and for Dalziel's projected *Illustrated Bible*. During his work on the latter he made a careful study of Egyptian art, and, as a result, produced in 1864 his *Israel in Egypt*, the same year exhibiting at the Academy *The Siren*.

EDWARD J. POYNTER.

In 1869 he was made an associate of the Academy; in 1871, Slade professor of art in University College, London; member of the Belgian Water-Color Society (1871). In 1876 he was elected a full Academician, his diploma work being *The Fortune-Teller*. In the same year he was appointed director for art, and principal of the training-schools at South Kensington, which positions he resigned in 1881, but retained his connection with the department as visitor of the training-schools. In 1883 he was elected a member of the Royal Water-Color Society. He exhibited his *Diadumene* at the Academy in 1885, his picture giving rise to a very lively discussion as to the nude in art, during the season. In 1894 he was appointed director of the National Gallery, succeeding Sir F. Burton. In 1896 there was great interest manifested in the selection of a president to fill the place left vacant by Sir John Millais, who was able to enjoy for but a brief period the honor bestowed upon him by his fellow-members on the lamented death of Lord Leighton. Early in October, the honor was awarded to Mr. Poynter, who, it

was understood, was the Queen's favorite for the place. He was invested with the customary chain of office and knighted at Windsor, Nov. 26, 1896. Among the works of the president not already mentioned are *Faithful unto Death* (1865); *Offerings to Isis* (1866); *The Catapult* (1868); *The Prodigal Son* (1869); *Proserpine* (1869); *Andromeda* (1870); *The Suppliant to Venus* and *The Ibis Girl* (1871); *Perseus and Andromeda* (1872); *More of More Hall* and *The Dragon of Wantling* and *Rhodope* (1874); *The Festival* and *The Golden Age* (1875); *Atalanta's Race; Zenobia;* and *Cecil Wedgwood* (1876); *Zenobia Captive* (1878); *Nausicaa and Her Maidens* (1879); *The Ides of March* (1883); *Outward Bound* (1886); *A Corner of the Market-Place* (1887); *Under the Sea Wall* (1888); *A Corner in the Villa* (1889); *Pea Blossom* and *On the Temple Steps* (1890); *The Meeting of Solomon and the Queen of Sheba* (1891); *When the World Was Young* (1892); *Chloe* (1893); and *Horæ Serenæ* and *Idle Fears* (1894). Among his portraits are those of *Mrs. Langtry* (1878); *Lord Ripon* (1886); *Sir Gerald Graham* (1886); and *Earl of Harwood* (1888). His other work exhibits a varied genius. He published *Ten Lectures on Art* in 1879.

POZZUOLANA. See BUILDING, Vol. IV, p. 410.

PRADON, NICOLAS, a French dramatist (1632–1698). See RACINE, Vol. XX, p. 214.

PRAED, MRS. CAMPBELL MACKWORTH, a British novelist; pseudonym and maiden name Rosa Murray-Prior; born in Queensland, March 27, 1852. She was married in 1872 to Campbell Mackworth Praed, nephew of the poet W. M. Praed. She wrote a number of novels and dramas, and in collaboration with Justin McCarthy a number of novels. Among the latter are *The Right Honorable* (1886); *The Rebel Rose* (1888); and *Christina Chard* (1894). Among her individual works are *An Australian Heroine* (1880); *Moloch* (1883); and *The Romance of a Station* (1890).

PRAGUE, the capital of Bohemia. For early history, see Vol. XIX, p. 677. Prague has made rapid progress in recent years both industrially and educationally. It is the junction of seven railway lines and of numerous roads of the crown land. It has manufactures of all kinds of metal wares, chemicals, cotton spinning, calico printing, tanning, glove making and railway wagon and carriage building. It has 57 Roman Catholic, four Protestant and one Russian church and ten synagogues. There is a large and increasing number of scientific, literary, artistic, social and benevolent institutions. Population 1901, exclusive of garrison and suburbs, 201,589. The garrison numbers over 7,000 and the suburbs reach nearly 90,000.

PRAIRIE-DOG. See MARMOT, Vol. XV, p. 567.

PRAIRIE DU CHIEN, a city and the capital of Crawford County, southwestern Wisconsin, 54 miles S. of La Crosse, on the Chicago, Burlington and Northern and the Chicago, Milwaukee and St. Paul railroads, and on the Mississippi River. It has a machine-shop, a flouring-mill, a large saw-mill, an oil-mill and two plow factories; also St. John's College (Roman Catholic) and a high-school. Population 1890, 3,131; 1900, 3,232.

PRAIRIE-HEN. See GROUSE, Vol. XI, p. 198.

PRAIRIES, the name given by the early French settlers in America to extensive tracts of land, either level or rolling, destitute of trees, and covered with coarse grass. The district to which the term is commonly applied embraces the Mississippi Valley from Texas to British Columbia and from Illinois to the Rocky Mountains. See *Mississippi Basin*, under UNITED STATES, Vol. XXIII, p. 844, p. 865, 866.

PRAIRIE-SQUIRREL, the popular name applied in the United States to any species of *Spermophilus*. They are often called ground-squirrels, but this name is usually given to members of the genus *Tamias*, which includes the chipmunks. The prairie-squirrels are terrestrial, not arboreal, and live in burrows. Owing to similar habits, they are confused with the gophers (*Geomydidæ*). About a dozen species of *Spermophilus* are found in the United States.

PRAIRIE-WOLF OR COYOTE (*Canis latrans*), a small wolf common on the Western plains of North America. The other American species of wolf is *C. lupus*. This is apparently identical with the Old World form, and the numerous species, formerly regarded distinct, are now by many authorities considered local varieties. See WOLF, Vol. XXIV, p. 662.

PRATINAS. See DRAMA, Vol. VII, p. 350.

PRATT, CHARLES, merchant and philanthropist, was born at Watertown, Mass., on October 2, 1830, and at the age of nineteen was employed in the business with which he was identified for the rest of his life. He settled in New York in 1851, and became the head of one of the largest

PRATT INSTITUTE.

houses in the paint and oil trade. He was a pioneer in the development of the petroleum industry, built a great refinery, and became a member of the Standard Oil Company. He built and endowed the Pratt Institute, a great school of art and industry, in Brooklyn, was a benefactor of the Adelphi Academy in Brooklyn, gave large sums to the Baptist Church and its working societies, and founded an industrial

savings bank. He established a free reading room in his native town, and was a benefactor of Amherst College. He died on May 4, 1891. W.F.J.

PRATT LIBRARY, BALTIMORE.

PRATT, Enoch, philanthropist, was born at North Middleborough, Mass., on September 10, 1808, was educated at the Bridgewater Academy, and at the age of fifteen years entered business life in Boston. Eight years later he removed to Baltimore, and became an iron manufacturer, banker, railroad director, and municipal financier. He became interested in educational and other public interests, and gave large sums of money for their furtherance. He endowed a free school in his native town, gave the Pratt Free Library to Baltimore in 1886 at a cost of more than a million dollars and generously endowed the House of Reformation and Instruction for Colored Children, the Shepherd and Enoch Pratt Hospital and other institutions. He died at his home near Baltimore on September 17, 1896. W.F.J.

PRATT, John Francis, scientist, was born at Pomfret, Vermont, on June 18, 1848, and was graduated from Dartmouth College in 1871. He became an engineer, served on the U. S. Coast and Geodetic Survey from 1871 to 1883 as an aid, and as an assistant since 1884. He was an assistant astronomer in the Transit of Mercury expedition of 1878 and the Transit of Venus expedition of 1882, commanded the U. S. Schooner *Yukon* in Puget Sound and the Straits of Fuca in 1884–90, was chief astronomer of the International Alaska Boundary Commission in 1893, and since the last date has been engaged in explorations and surveys in nearly all parts of Alaska. W.F.J.

PRATT, Orson, clergyman and educator, was born at Hartford, N. Y., on September 19, 1811, and at an early age embraced the Mormon faith and became a leader of that church. He was chosen to be one of the twelve Mormon Apostles in 1835, and for a number of years after 1840 was in charge of the Mormon mission work in Europe. He was professor of mathematics in the University of Deseret, and wrote a volume on *Cubic and Biquadratic Equations*, and left in manuscript a *Treatise on the Differential Calculus*. He was also the historian and recorder of the Mormon Church, and wrote several books on theological topics. He died on October 3, 1881. W.F.J.

PRATT, Parley Parker, clergyman, brother of Orson Pratt, was born at Burlington, N. Y., on April 12, 1807, became a Baptist preacher, and in 1830 was converted to Mormonism. In the latter church he became one of the most eloquent and influential preachers of his time. In 1835 he was chosen one of the twelve Mormon Apostles, and in 1847 he was one of the pioneers who selected the valley of the Great Salt Lake as the place of settlement of the Mormons. He was one of the most voluminous writers on Mormon doctrines, faith and practice, and published some stirring appeals to the "Gentiles" to embrace the Mormon faith. He was killed at Van Buren, Ark., on May 13, 1857. W.F.J.

PRAWN. See Crustacea, Vol. VI, p. 570.

PRAYER, The Book of Common. See England, Vol. VIII, p. 303.

PREBLE, Edward, an American naval officer; born at Falmouth (now Portland), Me., Aug. 15, 1761. He entered the Provincial navy of Massachusetts in 1779; took part in the action between the *Protector* and the British privateer *General Duff;* was afterward captured and confined on board the prison-ship *Jersey*, at New York. On liberation he joined the *Winthrop*, and distinguished himself in the capture of a brig at Castine, Me.; was commissioned lieutenant in the United States navy in 1799 and took command of the *Pickering*. The same year he was made captain, and appointed to the *Essex*. In 1803 he was commodore of the squadron sent against Tripoli, his flagship being the *Constitution*. Here he engaged in heavy fighting until relieved by Commodore Barron in the fall of 1804. On returning home in 1805 he received a gold medal and thanks from Congress. He died in Portland, Me., Aug. 25, 1807. E.E.T.

PREBLE, George Henry, naval officer; born in Portland, Me., Feb. 25, 1816. He entered the navy as a midshipman in 1835; was executive officer of the *Petrel* in the Mexican War; and at the opening of the Civil War was executive officer of the *Narragansett* in the Pacific. As commander of the *Katahdin* he served under Farragut in the Mississippi in 1862, was unjustly dismissed from the navy in September for permitting a blockade runner to enter Mobile Bay, but was exonerated and replaced in February, 1863. He was made captain in 1867, commodore in 1871, and rear-admiral in 1876. He died in Boston, Mass., March 1, 1885. G.J.H.

PRECEDENTS. See COMMON LAW, Vol. VI, p. 186; LAW, Vol. XIV, p. 365; also, ROMAN LAW, Vol. XX, p. 716.

PRECESSION OF THE EQUINOXES. See ASTRONOMY, Vol. II, p. 694.

PRÉCIEUSES. See RAMBOUILLET, Vol. XX, p. 277.

PREECE, WILLIAM HENRY, a British electrical engineer; born in Carnarvon, North Wales, Feb. 15, 1834. He attended King's College, London; engaged in electrical work in 1852 in the telegraph service of the Electric and International Telegraph Company, and afterward held positions of importance in that and other companies. When the telegraphs became government property in 1870 he was retained as divisional engineer; became chief electrician in 1877 and engineer-in-chief in 1892. He published a number of papers on electricity, and, with Sir James Sivewright, a *Text-book of Telegraphy.*

PRE-EMPTION, in law. See HOMESTEAD, Vol. XII, p. 126; and SALE, Vol. XXI, p. 219.

PREFECT. See PRÆFECT, Vol. XIX, p. 672.

PREJEVALSKY, NICOLAI MICHAELOVITCH, a Russian explorer; born in Smolensk, Russia, March 31, 1839. He entered the Russian army in 1855, and took part in quelling the Polish insurrection of 1861. He was sent on staff duty to Siberia in 1867, and from that time until his death devoted the greater part of his time to travel in Asia in the Amur and Yang-tsze-Kiang valleys. He rediscovered Lobnor in East Turkestan. His ambition was to reach Lhassa, Tibet, and he made three unsuccessful attempts to reach that point, but was each time turned back by the Tibetan authorities. He died at Karakol, West Turkestan, Nov. 1, 1888, while starting on a fourth attempt. The reports of his various expeditions are preserved in the *Proceedings* of the St. Petersburg Geographical Society.

PREMIUM. See INSURANCE, Vol. XIII, p. 168.

PREMONSTRATENSIAN. See ABBEY, Vol. I, p. 25.

PRENDERGAST, SIR HARRY NORTH DALRYMPLE, a British soldier; born October 15, 1834. He served in Persia in 1857, in Central India, in Abyssinia, and was aide-de-camp to Lord Ripon while the latter was viceroy of India. He was placed in command of the expedition to Upper Burma against Theebaw in 1885, and compelled the surrender of Mandalay. He was knighted in 1885, and after that date was in command in Burma and other Indian districts.

PRENTICE, GEORGE DENISON, an American journalist; born in Preston, Conn., Dec. 18, 1802. He graduated at Brown University in 1823; studied law, but did not practise. In 1828 he became editor of the *New England Weekly Review* at Hartford, Conn., and in 1831 removed to Louisville, Ky., where he took the editorship of the *Louisville Journal.* He held high rank as a journalist and was the author of some poems and humorous pieces. He died in Louisville, Ky., Jan. 22, 1870. E.E.T.

PRENTISS, ELIZABETH PAYSON, author; born in Portland, Me., Oct. 26, 1818; wife of George Lewis Prentiss. She began to contribute to the *Youth's Companion* of Boston at sixteen. Her most popular book was *Stepping Heavenward.* She died in Dorset, Vt., Aug. 13, 1878. G.J.H.

PRENTISS, GEORGE LEWIS, an American clergyman and educator; born in Gorham, Me., May 12, 1816. He graduated at Bowdoin College in 1835. He was an assistant at Gorham Academy, 1835–36; studied two years at Halle and Berlin, and spent some time in England. He was pastor of the South Trinitarian Church, New Bedford, Mass., 1845–50; of the Mercer Street Presbyterian Church, New York, 1851–58; and of the Church of the Covenant, New York, 1862–73; professor of pastoral theology, church polity, and mission work at Union Theological Seminary, 1873–96, and thence, till his death, professor emeritus. He died in New York, N. Y., March 18, 1903. E.E.T.

PRENTISS, SERGEANT SMITH, orator; born in Portland, Me., Sept. 30, 1808; was graduated at Bowdoin College in 1826; studied law, and went to Natchez, Miss., where he was admitted to the bar in 1829. He quickly gained prominence in his profession, and attained phenomenal success at Vicksburg, whither he removed in 1832. His powers as an orator were early displayed, and in the Mississippi legislature, to which he was elected in 1835, he became the leader of his party. A speech made by him at Portland, Me., on July 4, 1836, won him the reputation of being the most finished orator of his time. He was elected to Congress by the Whigs in 1837, and, his seat being contested, he defended it in a three days' speech that won him a national reputation as an orator. Webster remarked, on leaving the hall, "Nobody can equal that." He was rejected by the casting vote of the speaker, Mr. Polk, but went back to the people, and was triumphantly re-elected. But political life was not to his taste, and he soon abandoned it to return to his profession. He had won the "Commons," a portion of the city of Vicksburg, in an equity suit in 1837, but the United States Supreme Court decided against his title in 1845, and he lost the property with the costly buildings he had erected on it. In 1846 he removed to New Orleans, and practiced there until his death, July 1, 1850. G.J.H.

PRE-RAPHAELITES. See ROSSETTI, Vol. XX, p. 880.

*PRESBYTERIANS IN AMERICA. The Presbyterian Church is one of the most powerful religious bodies in the Christian world. It is preëminently strong in the United States and Canada. (Information concerning its doctrines and government is to be found in the article, PRESBYTERIANISM, Vol. XIX, pp. 696–721.) Altogether there are 89 sects, which hold more or less completely the Presbyterian system of doctrine and mode of government. Of these, 18 are found in North America, and report themselves to THE ALLIANCE OF REFORMED CHURCHES HOLDING THE PRESBYTERIAN SYSTEM. These are

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(1) the Presbyterian Church in Canada; (2) the Presbyterian Church of Canada in connection with the Church of Scotland; (3) the Synod of the Maritime Provinces in connection with the Church of Scotland; (4) the Presbyterian Church in the United States of America; (5) the Presbyterian Church in the United States (Southern); (6) the Cumberland Presbyterian Church; (7) the Cumberland Presbyterian Church (colored); (8) the Welsh Calvinistic Methodist (or Presbyterian) Church in the United States; (9) the United Presbyterian Church of North America; (10) Synod of the Associate Reformed Presbyterian Church of the South; (11) the Associate Reformed Presbyterian Church of North America; (12) General Synod of the Reformed Presbyterian Church in America; (13) Synod of the Reformed Presbyterian Church in America; (14) the Reformed Presbyterian Church (Covenanted); (15) the Reformed Presbyterian Church in the United States and Canada; (16) Reformed Church in America (formerly called Dutch); (17) Christian Reformed Church in America; (18) Reformed Church in the United States.

Churches.	No. of Presbyteries, or Classes.	Congregations.	Ministers.	Ordained Officers.	Probationers or Licentiates.	Students.	Communicant Church Members.	Sabbath Schools.	Sabbath-School Officers, Teachers and Scholars.	Contributions.	
										Self-Support and Home Work.	Foreign Missions.
(2) Synod of the Presbyterian Church in Canada, in connection with the Church of Scotland	1	5	61	57	----	----	1134	5	691	$10,145	$2,800
(3) Synod of the Maritime Provinces, in connection with the Church of Scotland	2	14	12	200	1	----	1000	12	550	----	----
(6) General Assembly of the Cumberland Presbyterian Church	126	2884	1704	16090	281	268	193393	1705	118163	No Report.	
(7) General Assembly of the Cumberland Presbyterian Church (Colored)	23	224	----	----	----	----	12956	----	----	No Report.	
(8) General Assembly of the Welsh Calvinistic Methodist or Presbyterian Church in the United States	18	----	108	474	----	12	12285	----	13373	85,875	11,570
(9) General Assembly of the United Presbyterian Church of North America	64	790	864	3736	75	99	117706	1127	115344	1,361,545	86,175
(10) Synod of the Associate Reformed Presbyterian Church of the South	9	126	87	750	6	8	10640	98	8436	64,215	8,090
(11) Synod of the Associate Reformed Presbyterian Church of North America	----	----	----	----	----	----	----	----	----	No Report.	
(12) General Synod of the Reformed Presbyterian Church in America	7	49	40	550	3	9	6200	49	3900	No Report.	
(13) Synod of the Reformed Presbyterian Church in America	12	119	109	670	18	10	9787	45	11501	51,670	4,000
(14) The Reformed Presbyterian Church (Covenanted)	----	3	----	----	----	----	37	----	----	----	----
(15) The Reformed Presbyterian Church in the United States and Canada	----	1	----	----	----	----	600	----	----	----	----
(16) General Synod of the Reformed Church in America	35	618	660	----	19	146	103346	874	117260	1,218,960	164,150
(17) Synod of the Christian Reformed Church in America	7	122	79	750	2	50	16500	110	21100	67,500	2,250
(18) General Synod of the Reformed Church in the United States	55	1636	961	----	----	304	226572	1643	190524	1,296,925	27,185

The above table gives a brief compendium of a part of the above-named branches.

According to the reports made to the Alliance of Reformed Churches Holding the Presbyterian System, at its meeting in Glasgow in 1896, there are in the 89 branches 1,426 presbyteries, 31,925 congregations, 27,043 ministers, 130,083 ruling elders, 2,666 licentiates, 5,019 students in preparation for the ministry, 4,795,216 communicant members, 32,271 Sabbath schools, and 3,653,925 Sunday-school officers, teachers and pupils. For the support of work at home the contributions for 1895 were $31,521,150, and for foreign missions, $2,375,310. There are reported altogether in the United States and Canada 20,398 congregations, 15,535 ministers, 68,729 ruling elders, 1,259 licentiates, 3,296 students in preparation for the gospel ministry, 2,170,517 communicant members, 18,480 Sunday-schools and 2,067,097 Sunday-school officers, teachers and pupils; and for self-support $19,625,315 was contributed by the people.

Referring to Canada first, there were six separate factions, which formed a general union there in 1875, calling it "The Presbyterian Church in Canada." This leaves but two minor denominations standing separate. The union has 53 presbyteries, 919 congregations, 1,077 ministers and 179,579 communicants; and has enjoyed not only peace but much prosperity in the new relation.

The second largest branch of the Presbyterian body in the United States is known as the Southern Church, the accurate title of which is *The Presbyterian Church in the United States.* It dates its organic life from December, 1861, where it was first entitled "*The Presbyterian Church in the Confederate States of America.*" Its first General Assembly convened in Augusta, Georgia, with 93 ministers and ruling elders as commissioners, representing 47 presbyteries. There were no new articles of faith adopted,

and the standards of the church from which they parted were retained by a unanimous vote.

Presbyterians in the South stood then, as they do now, if anything, more four-square to the doctrinal positions of the body than do those in the North. It was mainly the issues of national life which divided the church. In the meeting of the General Assembly of the Presbyterian Church (Old School), at Philadelphia, May, 1861, a paper, offered by Rev. Dr. Gardiner Spring of the Brick Church, New York, was adopted, which proved to be the dividing wedge. It asserted that sovereignty resides in the people of the republic as a mass and not by states. This was not only esteemed erroneous and repugnant by men of the South, but, whether right or wrong as a contention, they considered it as transcending the sphere of her authority for the church to make such a deliverance. Having withdrawn and integrated themselves in the South they diligently addressed themselves to the propagation of Presbyterian doctrines and development. And after 1865, thoughts of peace began to pass between the church of the North and the church South. But obstacles of different kinds have recurrently arisen to bar the way to reunion. Meanwhile, the church South has made steady and, we may add, signal progress in view of all the circumstances. There are 13 synods; 76 presbyteries; 1,349 ministers; 85 licentiates; 402 students for the ministry; 2,788 churches and 8,656 ruling elders. In 1895, 11,874 new communicants were added on confession of faith, making the total membership 210,539. The officers, teachers and pupils in their Sunday-schools number 157,958, and $1,856,515 passed through the treasuries of their churches as reported.

As noted, the article, PRESBYTERIANISM, above referred to in Vol. XIX, brings the history of the Northern church down to the period of the reunion of the Old and New School. The inception of that auspicious event came close after the war ended (in 1865) between the North and the South; but the earliest impulses toward it were felt during the war. The Old School Assembly, meeting in Columbus, Ohio, 1862, suggested an interchange of commissioners with the New School, to which, in due time, the New School responded, in resolutions, expressing great pleasure in such a fraternal act.

At last, in 1868, tangled questions which troubled the attempt at settlement were swept away by the proposal that reunion should be made upon the basis of the Standards, pure and simple, "leaving all other matters for re-adjustment after the reunion should take place." Naturally, there were some reluctant to follow, although acknowledged leaders in both bodies were generally agreed and eager to advance. Minister and layman of first rank on both sides took hold with high zeal; and the joint committee of the bodies making a report, the Old School Assembly adopted it by a vote of 285 to 9, and the New School Assembly voted unanimously to reunite on the basis as aforesaid. By prearrangement and in good hope both the Old and the New School Assembly met in May, 1869, at Pittsburg, Pennsylvania. Of the 144 Old School presbyteries, all but 13, and all of the 113 New School presbyteries had voted in favor of the consummation so devoutly wished. Every act essential to a cession of the individual existence of the two was performed. Then each assembly formally adjourned to meet in Philadelphia in May of the following year. And they did meet together in the same church, where, at the disruption which occurred in 1838, the New School gathered to begin its separate life. From that result immeasurable benefits have flowed, and the statistical facts of growth are very great, so that in 1896 there were 31 synods, 224 presbyteries, 6,942 ministers, 455 licentiates, 176 local evangelists, 1,508 candidates for the ministry, 7,573 churches, 36,199 ordained lay officers. In 1895 there were 64,806 added to the churches on confession of faith, and 38,489 on certificate, making the entire communicant roll 943,716. Denominational and local church expense account aggregated $11,283,975. For home missions, $980,556; foreign missions, $739,103; education, $102,367; Sunday-schools, $130,598; church erection, $155,177; relief of disabled ministers, $94,353; freedmen, $109,205; other objects, $554,143. The total offering to all the treasuries reporting is $14,149,477. Of this a notable share of strength and service is found in the Sunday-schools of the church, their contributions amounting to $706,693. The schools number 7,872; teachers and officers, 114,822, and pupils, 955,364.

In 1887 the assembly appointed a committee on church unity to confer with a commission, created by the Protestant Episcopal Church at the general convention in Chicago in 1886, concerning certain propositions presented by this body as a basis for the restoration of the organic unity of the church. Readiness to co-operate in the movement, whose motive was to discountenance schism and to heal the unhappy divisions in Christendom, was expressed by this committee in its correspondence with the commission; and earnest efforts were made to come to an agreement. The correspondence was, however, suspended in May, 1896, without any practical conclusion having been reached, with an expression of hope that the time might soon come when it may be reopened by the acceptancy, on the part of the commission for its church, of the doctrine of "mutual recognition and reciprocity."

In the year 1860 Mrs. Mason, returning to America from India, was, while stopping at Calcutta, moved to deep sympathy for the Zenana women of India. Her eloquent appeal on their behalf resulted in the organization of the Women's Union Missionary Society. The Woman's Board of Missions was organized in 1868 in Boston to co-operate with the American Board (Congregationalist), and on Oct. 4, 1870, the Woman's Foreign Missionary Society of the Presbyterian Church was fully organized in Philadelphia. This was followed by the organization of six other woman's boards in New York City, in Chicago, in St. Louis, in San Francisco, in Portland, Oregon, and in northern New York. The gifts from the woman's boards from 1885 to 1895 amounted to over three millions of dollars.

Once the women were embarked in the enter-

prise of foreign missions, others became concerned to do a part in home-missionary work through a society of their own. As a consequence the woman's executive committee in New York was organized in 1878; and their fields of labor are in Alaska, Mexico, Utah and among the mountain whites of the South. By the schools and missions which they have started and supported among these neglected peoples great results have been achieved. According to the report of 1896 they have 118 schools and missions, 378 teachers, 9,326 pupils, and their contributions were $314,941.

In the year 1883, in the city of Portland, Maine, the Young People's Christian Endeavor Society was started in the Williston Church. It was begun by the Congregationalists of New England. But very soon its excellences and advantages were apparent to young people of the Presbyterian churches, and it became a favorite. Hence the number of local Christian Endeavor societies in Presbyterian churches—over seven thousand, junior and senior both counted—the largest of any denomination. In the years 1894–95 some stir was made in one section of the country in the interest of a movement to denominationalize these societies, it being thought that young people of the Presbyterian Church should be organized more closely with the body. The General Assembly, meeting in Pittsburg, May, 1895, appointed a large and influential committee to consider the subject and report to the next assembly. When this committee reported to the assembly in Saratoga in 1896 there was a decided disapproval, judged by the votes against the report, so as to indicate that the church favors the *status quo*, and would not consider a more stringent church control of the young people's societies.

In the year 1889, 15 presbyteries overtured the General Assembly to provide for some revision of the Confession of Faith. In response the assembly of 1890 sent down two questions to be answered by the next assembly, of 1891:

1. Do you desire a revision of the Confession of Faith?

2. If so, in what respects and to what extent?

Responses came from all but four presbyteries and these were in foreign missionary fields. The main vote stood 68 nays and 134 yeas, 92 of these specifying their desire that the system of doctrine should not be impaired. A committee on revision was then appointed, consisting of 15 ministers and 10 elders, and instructed not to "propose any alterations or amendments that will, in any way, impair the integrity of the Reformed or Calvinistic system of doctrine taught in the Confession of Faith." At the next assembly, meeting in Detroit, the committee reported progress, and recommended that the changes, which they proposed, should be sent down to the presbyteries for consideration, criticism or amendment. The final report was made the next year (1892) at Portland, and sent down to the presbyteries for their enacting approval. Two thirds of all the presbyteries was necessary to enact, and it was not given for any part of the report. Thus, after four years of diligent study and discussion, the mature judgment of the entire church was recorded against any change in her confessional basis of faith.

Few churches in Christendom give more generously for the support of undenominational institutions for the propagation of the Gospel, such as the American Tract Society, the American Sunday School Union and the American Bible Society. No other church requires less of subscription to confessional standards in order to membership. Thus it has been, and is, that among her ministry there may be found, here and there, one concerning whose orthodoxy common fame reports disparagingly; and yet, from year to year, no complaint is made to the courts of the church. A famous case which terminated otherwise was that of Professor Charles Augustus Briggs, D.D., of New York. For a discussion of this case, see BRIGGS, CHARLES AUGUSTUS, and UNION THEOLOGICAL SEMINARY, in these Supplements.

Very naturally, these events connected with the trial of Dr. Briggs awakened attention to the relation of the theological seminaries to the General Assembly, of which seminaries there are 14.

Previous to reunion (1870), the theological seminaries had been organized differently—some by the General Assembly, some were under control of the synods, and some were close corporations. Union Seminary belonged to the last class. At reunion an effort was made to secure a uniform relation of the seminaries to the assembly, so far as to clothe that supreme court with power to approve or disapprove appointments made by the boards of control in the seminaries. No appointment to a professorial chair should be considered complete if disapproved by a majority vote of the assembly. But in this compact of 1870, there was no legal basis laid for enforcing its sanctions. This, in connection with the Briggs controversy, led to the appointment of a committee of 15, by the assembly of 1892, to "take into consideration the whole subject of the relation of the assembly to its theological seminaries, to confer with the directors of these seminaries and report to the next General Assembly such action as, in their judgment, will result in a still closer relation between the assembly and its seminaries." The work of this committee was continued through four years, and secured what they desired from some of the seminaries. With others they failed, and the assembly, discharging the committee in 1896, committed to the boards of control of the seminaries the matter of so securing and safeguarding these institutions to the church that no danger of defection or diversion of funds or property from the church can occur.

JOHN LINDSAY WITHROW.

PRESCOTT, a city and the capital of Yavapai County, central Arizona, in an amphitheater made by inclosing mountain-ranges; 78 miles N. of Phœnix, on the Santa Fé, Prescott and Phœnix branch of the Atlantic and Pacific railroad. It is at a considerable elevation above the sea, and its climate is considered beneficial to invalids. A large business is done here in lumber, wool and bullion. The town is the trade-center of a large gold and silver mining region; also of a farming district. This is one of the most

important towns in Arizona. Population 1890, 1,759; 1900, 3,559.

PRESCOTT, a town and the capital of Nevada County, southwestern Arkansas, 5 miles S.W. of the Antoine Creek river and 31 miles S.W. of Arkadelphia, on the Prescott and Northwestern and the St. Louis, Iron Mountain and Southern railroads; an important cotton-shipping point; ships also live-stock, lumber, wool and furs. Population 1890, 1,287; 1900, 2,005.

PRESCOTT, WILLIAM, military officer; born in Groton, Mass., Feb. 20, 1726. He served during the French and Indian War at the capture of Cape Breton in 1758, showing such military ability that the British general in command offered him a commission in the regular army, which he declined. In 1774 he left his farm to take command of a regiment of minute-men, joining the army at Cambridge, where, on June 16, he was given command of three regiments, and ordered to Charlestown to occupy and fortify Bunker Hill. On the morning of the 17th the Americans were attacked in their hastily constructed works by the British ships and batteries, and later in the day by a strong body of infantry, who were driven back twice with great slaughter. On their third advance the Americans were nearly out of ammunition, and after a desperate hand-to-hand encounter were obliged to retreat, Colonel Prescott being one of the last to leave the intrenchments. Bancroft says: "No one appeared to have any command but Colonel Prescott, and his bravery can never be enough acknowledged and recorded." Prescott continued in the army until 1777, and died at Pepperell, Mass., Oct. 13, 1795. G.J.H.

PRESENTMENT, in criminal law, the formal act by which a grand jury makes an accusation of crime or draws attention to a public evil. No consequence is to ensue unless an indictment is enframed and a true bill formally returned thereon. See GRAND JURY, in these Supplements.

PRESERVES. See JAMS AND JELLIES, Vol. XIII, p. 573.

PRESIDENT, in the United States. See UNITED STATES, Vol. XXIII, p. 793; and, for method of election, ELECTORS, in these Supplements.

PRESQUE ISLE, a town of Aroostook County, northeastern Maine, 42 miles N. W. of Houlton, on the Bangor and Aroostook and the Canadian Pacific railroads, and on the Aroostook River. The greater portion of the surrounding country is hilly, and is covered with large forests of sugar-maple. Only in a few parts is the soil fertile, and the winters are extremely severe. Its chief products are oats, hay, potatoes, butter and lumber. Here is located Presque Isle Academy, a starch factory and several sawmills. Population 1890, 3,046; 1900, 3,804.

PRESS, PRINTING. See TYPOGRAPHY, Vol. XXIII, pp. 751–755; and PRINTING-PRESSES, in these Supplements.

PRESSENSÉ, EDMOND DEHAULT DE, a French Protestant clergyman and senator; born in Paris, Jan. 7, 1824. He studied in Paris, Lausanne, Halle and Berlin. On his return to Paris he was appointed pastor of the Taitbout Chapel, where he soon gained a high reputation as a preacher. He sat in the chamber of deputies, representing the department of the Seine, from July, 1871, until the close of the year 1875, and was elected a life-senator in 1883. He published many works, some of which have been translated into English. Among his publications are *Application of Christianity to Social Problems* (1849); *Catholicism in France* (1851); *Religious Liberty in Europe* (1870); and *Life of Jesus* (1884). He died in Paris, April 8, 1891.—His wife ÉLISE, authoress, was born in Switzerland, in 1826. She was the daughter of a Swiss littérateur, Du Plessis. She began her active literary work in 1858, when she published *Rosa*. This was followed by a series of books for children and several novels, of which *Sabine* and *Genevieve* are the best known. Mme. Pressensé was active in philanthropic work, and established schools in the poorer districts of Paris.

PRESSES. The use of presses for forming metal, punching, stamping, cutting, shearing, embossing, coining, and a great variety of other operations, has increased enormously within a score of years. The manufacture of great numbers of similar machines, having duplicate small parts, has rendered necessary the use of presses which would perform these operations in an economical manner. They are used in hundreds of different trades, and their number is continually increasing, while new styles and forms appear on the market with continual regularity. The same presses are often used for widely different purposes. Yet in many trades, special presses have to be built to suit the work. A firm that builds over 300 styles of presses advertises 13 forms suitable for use in making parts of bicyles and 15 for use in building typewriters.

The heaviest forms of presses are used in the great steel-mills, where enormous pressures are sometimes required. These are usually operated by hydraulic power, and many of them are doing work formerly done by the steam-hammer.

Presses for cutting tin, for use in forming cans, boxes, etc., are commonly made so that the bed may be inclined at any convenient angle. The cutting is done with dies, one being placed on the bed and its opposite in the ram. Heavy fly-wheels are used to secure a steady motion. Many of these machines have holes through the beds for dropping the blanks cut or punched out. Feed-roll attachments are made for work cut from continuous strips or sheets of metal. Slide-feeds and reel-feeds are both used. Automatic push-outs of various forms are also made, and knock-outs for work that adheres to the dies.

Coining-presses are made for stamping coins, medals, etc., and for embossing name-plates, badges and the like. The ornamental work on watch-cases and many kinds of jewelry is also stamped by the coining-press. The government machines used in the mints are usually very powerful, being operated by hydrostatic pressure, but for commercial work lighter machines are used; and a description of one form of these presses will answer for other makes. The Ferracute Machine Company's coining-press

has two side-columns and an arched top. The blanks to be stamped are fed in between the dies, which are located near the top of the machine, the toggle-joint which gives the pressure being located below, in order that no oil or grease may come from them to the coins. The arrangement also prevents any lost motion resulting from wear. The stroke which gives the pressure is only one eighth of an inch, which is much less than most presses of the sort, there being usually a long stroke to give better access to the dies. In this machine the upper die is fastened in an oscillating head, which can be swung out of place when it is desired to examine or clean the dies. A feeding-attachment is also provided.

Pattern-stamping presses are made in great variety for cutting and forming such work as oil-stove tops, ceiling-plates, stove-boards, furnace parts, shovels, etc. Lighter forms serve for cutting out pieced tinware, stovepipe elbows, coal and mortar-hods, armature disks, metal shingles and metal lath.

Deep-edged hollow work, such as metal cups for machines, dish-like articles of copper, silver, aluminum, etc., are formed in what is generally styled the drawing-press. In these the blank of sheet metal is held between two flat surfaces under a heavy pressure, amounting sometimes to several tons, while the central descending punch draws it from between them in a conical or cylindrical shape, leaving the sides without wrinkles—the metal being upset or thickened circumferentially and stretched or drawn out radially as the outer parts are reduced in diameter. In some work it is impossible to prevent wrinkling of the body in drawing. It is then necessary to removes the wrinkles later in a spindle lathe. Deepening or redrawing presses are also used for articles which cannot be sufficiently drawn out by a single operation.

A light form of press, in which the pressure is obtained by a screw, is manufactured for embossing, lettering or small fancy work on articles already formed in heavier machines.

Presses for special work are almost too numerous to place in a category. A few of the more important are the sugar-press, used for expelling molasses; the cane, hop, jelly, wine and oil presses, whose name tells their use; the bundling-press, for compressing skeins of yarn and similar articles into packages of rectangular form; the baling-press, serving a similar purpose for hay, cotton and other articles done up in bales; button-press, for stamping together the parts of a button, or for stamping out the blanks and impressing a design; crimping-press, for pressing leather articles into form; hat-press, for bringing a bat of felt or other material into form; concrete-press, for compressing soft concrete into building-blocks; upsetting-press, for upsetting a portion of a wheel-tire and shortening it by cramping the metal together; wiring-press, for wiring together pieced tinware, etc.

While the majority of presses described derive their power from the toggle-joint or some similar form of lever, yet many of the lighter forms make use of a screw to secure pressure. Some of the screwpresses have a heavy bar with weights at the end, which may be whirled around, giving a fly-wheel action, from which the name *fly-press* is derived. The name *cam-press* is given where a cam or cams are used to give the pressure; *pawl-press* where a pawl and ratchet drive the screw; *wedge-press* where the inclined plane or wedge principle is used; and compound-lever, duplex-lever and similar names are applied to indicate other mechanical principles involved. C. H. COCHRANE.

PRESTON, a village and the capital of Fillmore County, southwestern Minnesota, 100 miles S.S.W. of St. Paul, on the Chicago, Milwaukee and St. Paul railroad. It is in a farming and dairying district, and contains a graded school, a grist-mill, a woolen-mill, a brewery and two wagon-factories. Population 1900, 1,278.

PRESTON, HARRIET WATERS, author; born in Danvers, Mass., in 1843. She has traveled extensively in Europe; contributed frequently to magazines; published *Aspendale; The Guardians; Theodore Aubanet; Jacques Jasmin; Arthuriad; Songs of the Troubadours*, etc.; translated *Writings of Madame Swetchine*, and edited *Biography of Alfred de Musset*. G.J.H.

PRESTON, MARGARET (JENKIN), poet; born in Philadelphia, Pa., about 1825. In 1857 she married Prof. J. T. L. Preston, founder of the Virginia Military Institute. Her first contribution to the press in *Sartain's Magazine*, 1849, being very favorably received. She published a novel, *Silverwood*, in 1856, and, in 1865, her longest poem, *Beechenbrook, a Rhyme of the War*. Other works were *For Love's Sake; Old Songs and New*, etc. She died in Baltimore, Md., March 28, 1897. G.J.H.

PRESTON, THOMAS SCOTT, clergyman, was born at Hartford, Conn., on July 23, 1824, and was graduated from Trinity College in 1843 and from the General Theological Seminary of the Protestant Episcopal Church in New York in 1846. He entered the Protestant Episcopalian ministry, but in 1849 became a Roman Catholic and the next year was ordained a priest of that church. He was private secretary to Archbishop Hughes, and in 1855 became chancellor of the diocese of New York. In 1888 he was made prothonotary apostolic, and had charge of the prosecution of Dr. McGlynn (q. v.). He was the author of several books. He died in New York on Nov. 4, 1891. W.F.J.

THOMAS S. PRESTON.

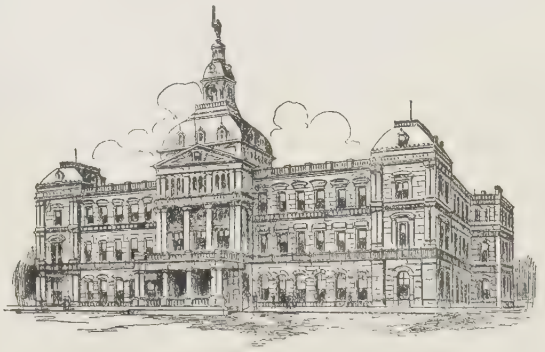
PRESTWICH, SIR JOSEPH, an English geologist; born in Clapham, near London, March 12, 1812. He was educated at Reading and at University College, London, where the bent of his mind was directed toward science by the lectures of Dionysius Lardner on natural philosophy. Though following a commercial rather than a scientific career, until

far advanced in life, Mr. Prestwich contrived to give great attention to geology and to contributions, partly undertaken at the suggestion of Sir Roderick Murchison, to the *Transactions* of the Geological Society. These contributions were mainly the results of his own observation and study of geological formations in the British Islands, including investigations into the sequence of organic remains in the London clay, into the valley gravels supposed to contain remains of man and his works in association with extinct mammalia, and into the interesting evidences relating to the ichthyolites of Gamrie, in Banffshire, Scotland. The contemporaneousness of man with the mammoth and other Pleistocene mammalia was fully established, and the antiquity of man came to be the most absorbing topic of the time. That vexed question still remains under discussion, although Prestwich, in some of his later articles, sought rather to reduce than to extend the time-limits of man's existence. In 1851 Prestwich published *A Geological Inquiry Respecting the Water-bearing Strata of the Country Around London,* which soon became the standard authority on the subject, and led to its author's appointment on the Royal Commissions on Metropolitan (London) Water-Supply in 1867, and to that of the Royal Coal Commission, to the reports of which, published in 1871, he contributed valuable papers on the Bristol and Somerset coal-fields. In these investigations he was led to infer that concealed coal-fields might extend from Somersetshire east to Folkestone, an inference which has been verified as correct by subsequent explorations at Dover. In 1853 Prestwich was elected a Fellow of the Royal Society, and in 1870 was appointed a vice-president. In the latter year he was chosen president of the Geological Society, and delivered two addresses before it on water-supply and on deep-sea researches. In 1871 his three great papers on the structures of the crag-beds of Suffolk and Norfolk were published by the Geological Society, while his attention was directed to the subject of the later tertiary deposits and the enumeration of organic remains. In 1874 the chair of geology at Oxford was accepted by him, and as the partial result of his labors in his professoriate there appeared from his pen two large volumes entitled *Geology, Chemical, Physical and Stratagraphical.* In 1896 he was knighted. He died at Shoreham, Sussex, June 23, 1896.

PRESUMPTION. See EVIDENCE, Vol. VIII, p. 648.

PRETENDER. See CHARLES EDWARD, Vol. V, p. 369; also JAMES FREDERICK, Vol. XIII, p. 570.

PRETORIA, capital of the late South African Republic (now Transvaal colony), is 1,040 miles N.E. of Capetown. It derives its name from Pretorius, one of the Boer leaders, and is a thriving place, well built, and with a considerable trade. Since the establishment of the South African Republic the progress of Pretoria has been so rapid that its population can only be approximately stated. Its white population is estimated at 8,000. Pretoria is the see of a bishop, who was consecrated in 1878. It contains 20 Dutch schools, besides a model school (255 pupils) and a gymnasium. Pretoria is connected with Capetown by railway via Bloemfontein, Kroonstadt and Germiston, and a line from Natal runs to Charlestown, about 160 miles from Germiston. In 1895 Pretoria was also connected by rail with Lorenzo Marquez, the Portuguese port on Delagoa Bay. The surrounding district is very fertile, being capable of producing wheat, tobacco, indigo, coffee, cotton, and sugar-



GOVERNMENT BUILDING AT PRETORIA.

cane. Coal and other minerals are also found within it. The trials of the Uitlander reformers took place in the Pretoria government building in 1896, and after their conclusion the Boers planned a series of fortifications to protect their capital from internal disturbance or external attack.

Owing to the failure of diplomatic negotiations in regard to the franchise between the Transvaal and Great Britain at Bloemfontein, in June, 1899, and continued disagreement between the Republic and the imperial country, increased war feeling prevailed in the Transvaal. This came to a head on Oct. 9th, when President Krüger sent from Pretoria an ultimatum to England demanding, among other things, the reference of the points in dispute to arbitration. As England could not agree to this, the British agent at Pretoria was instructed to apply for his passport, while the Dutch Republic proceeded to invade Natal and Cape Colony. The war, which was also joined in by the Orange Free State, lasted with varying fortunes from Oct., 1899, to Oct., 1900, when both republics were occupied by the British, most of the burghers surrendering, and President Krüger taking flight into neutral Portuguese territory. A lengthened period of guerilla warfare ensued. The capital (Bloemfontein) of the late Orange State was entered by the British on May 13, while Pretoria was similarly occupied on June 5, the Transvaal Republic being reannexed to or reincorporated with the English crown by Lord Roberts' proclamation early in Sept., 1900.

PRIBILOFF ISLANDS, a group of four islands in the Bering Sea, belonging to Alaska, about 250 miles N.W. of Unalaska. These islands are volcanic; the two largest are St. Paul and St. George; and are the breeding-place in summer of fur-seals.

PRICE, BONAMY, economist; born at St. Peter's Port, Island of Guernsey, England, in May, 1807. He graduated at Oxford in 1829, and taught in Dr. Arnold's Rugby School from 1830 until 1850. In 1868 he was elected professor of

political economy at Oxford, holding this position till his death, Jan. 8, 1888. He published a number of works on economical subjects. G.J.H.

PRICE, STERLING, soldier, was born in Virginia on September 14, 1809, and settled in Missouri in 1830. In the latter state he was a member of the Legislature, and was a representative in Congress in 1845–47. In the Mexican War he commanded a Missouri regiment in the New Mexican campaign, and served for a time as military governor of the state of Chihuahua. In 1853–57 he was governor of Missouri, and was a strong pro-slavery partisan. At the outbreak of the secession movement he strove to attach Missouri to the Southern Confederacy, presiding at the state convention in February, 1861, and as major-general of the state militia trying to turn the latter body and all its equipment over to the South, but was baffled by General Lyon. Price then organized an army of 12,000 men, and fought Lyon at Wilson's Creek, on August 10, 1861, Lyon being killed in the battle. The next year Price was made a major-general in the Confederate army, and commanded in the battles of Pea Ridge and Corinth. He suggested to Vallandigham and other Confederate sympathizers at the North the organization of the "Knights of the Golden Circle" and was himself made "Grand Commander" of that order. He invaded Missouri in 1864, expecting the "Knights" to rise and rally to his standard, but was disappointed and had to flee before Generals Curtis and Pleasanton. He went to Mexico and was a follower of Maximilian, after whose death he returned to Missouri and died there on September 27, 1867. W.F.J.

PRICE, THOMAS RANDOLPH, educator; born in Richmond, Va., March 18, 1839. He graduated at the University of Virginia, and subsequently studied literature and philology at Berlin and Kiel, and Greek and archæology at Athens. He served in the Confederate army; was made associate principal of the University School, Richmond, in 1866; professor of Greek and Latin at Randolph-Macon College in 1869; of Greek language and literature at Johns Hopkins University in 1876, and of English language in Columbia University in 1882. He died in New York, May 7, 1903. G.J.H.

PRICKLY-ASH, a tree of the family *Xanthoxylaceæ*, or, as some later botanists place it, of this tribe of the rue family (*Rutaceæ*). The *Xanthoxylum Americanum* is the abundant prickly-ash of the northern United States. It is a shrub, with an aromatic, pungent bark. The Indians were known to chew the bark for the relief of toothache, hence the name sometimes given to this shrub of "toothache tree." The southern prickly-ash is the *X. Clava-Herculis*. It is a large shrub or tree, with numerous sharp prickles.

PRICKLY-PEAR. See CACTUS, Vol. IV, p. 556.

PRIDE'S PURGE. See PRIDE, Vol. XIX, p. 743.

PRIESTLEY, SIR WILLIAM OVEREND, surgeon; born in 1829; was educated at King's College, Edinburgh, and then studied in Paris. Later he was appointed physician and lecturer at the hospital of Middlesex. He next accepted the chair of obstetric medicine at King's College, and also became consulting physician at the hospital of that institution. He was physician to Princess Louis of Hesse (Alice of Great Britain), and also to Princess Christian of Schleswig-Holstein. He was also president of the Obstetrical Society of London. In 1896 he was elected to Parliament to represent the universities of Edinburgh and St. Andrews. He was the author of numerous works on medical science and natural history. He died in London, April 11, 1900. G.J.H.

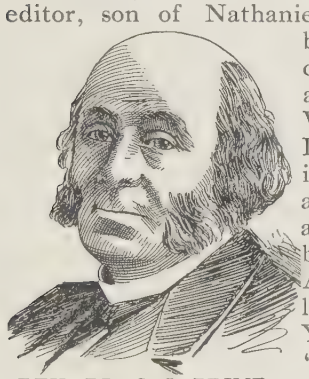
PRIMARY CELLS. See ELECTRICITY, §§ 97 and 108, in these Supplements.

PRIMARY ELECTIONS. The basis of all political organizations in the United States, the point where is begun and upon the action of which depends the nomination of party tickets, from those which include the candidacy of the town mayor or alderman to those which have at their head the candidate for the Presidency of the United States, is the primary or district caucus. The primary and the caucus (q.v., in these Supplements) are to some extent the same, but usage and legislation have added to the primary in most of the states the necessity of a secret ballot by those qualified to vote under the rules of each party. The term caucus carries with it an idea of *viva voce* voting, while primary implies a formal vote in determining the choice of delegates. With the formation of political parties and the consequent party machinery, it was found necessary to adopt some plan by which an expression of the wishes of partisan voters might be obtained without requiring a large gathering. The primary meeting was designated by custom as the originating-point for all political action: there the partisans of a ward, precinct or township gathered and gave expression to their wishes both as to candidates for office and the platform. These wishe were in turn conveyed to a higher convention by delegates, and so on until the national convention was reached. The primary was in this way the part of the political machinery the control of which fixed the character of the larger convention. While population was scattered, and an acquaintance of the voters one with another was possible, the primary, after the manner of the town-meeting, served its purpose well. In rural districts the primary is still amenable to good purposes. But in cities, where extended acquaintance is impossible, unprincipled and designing leaders sometimes "pack" the meeting and instruct and elect delegates to serve their own ends. Frauds are thus perpetrated, and the control of the party vote in large cities is placed in the hands of a few "bosses." The better class of citizens revolted against this rule, and the system of primaries has been in many states so altered that due notice of the time and place of the meeting is required to be given. Further changes direct nominations to be made by ballot; voting-places are kept open a definite number of hours on a fixed day; judges, clerks and challengers are appointed, and a register of the voters kept. The qualifications of a voter,

however, remain to a great extent in the hands of the party leaders. Generally, only those are allowed to vote whose names are on the registration-rolls of the last city, county or state election. In some of the larger cities a party list is kept by district committee-men of all known voters of their particular party within the limits of the district, and no one can vote at the primaries whose name is not on this list. While this places the control of the district in the hands of a few, yet when occasion requires a fair expression of party opinion can be obtained. Many states have legislated to govern primary elections. These laws are many and varied. The general plan as here outlined is the usual result of such legislation. While the system of primary elections has been modified and reformed, yet owing to the indifference and neglect of the better class of party voters the nominations are largely controlled by men who make politics a business. It should be realized that only so far as the primaries are carried for good-citizenship will the national convention be controlled by principle.

PRIMATES. See MAMMALIA, Vol. XV, pp. 451–452; and ANTHROPOLOGY, Vol. II, pp. 96–98.

PRIME, SAMUEL IRENÆUS, clergyman and editor, son of Nathaniel Scudder Prime, was born at Ballston, N. Y., on November 4, 1812, and was graduated from Williams College in 1829. For some years he taught in schools at Cambridge and Sing Sing, N. Y., and then became a Presbyterian preacher. On August 18, 1838, he published a letter in the New York *Observer*, signed "Irenæus," and thereafter for many years such letters formed a leading feature of that paper. He became editor of the *Observer* in 1840, and with the exception of 1849–50, when he was secretary of the American Bible Society, he filled that editorial chair for nearly half a century. He was the author of a number of books and notable addresses. He died on July 1, 1885. W.F.J.



REV. DR. S. I. PRIME.

PRIME, EDWARD DORR GRIFFIN, clergyman, brother of Samuel Irenæus Prime, was born at Cambridge, N. Y., on November 2, 1814, and was graduated from Union College in 1832, and from Princeton Theological Seminary in 1838. He was pastor of several Presbyterian churches, and from 1853 to 1885 was associated with his brother, S. I. Prime, in the editorship of the New York *Observer*. In the winter of 1854–55 he was chaplain of the American legation at Rome. He was the author of a history of the Prime family. He died in New York on April 7, 1891. W.F.J.

PRIME, NATHANIEL SCUDDER, clergyman, father of S. I., E. D. G., and W. C. Prime (q. v.), was born at Huntington, Long Island, N. Y., on April 21, 1785, became a Presbyterian preacher on Long Island, and at Cambridge, N. Y., and in 1821 became head of the Washington Academy at the latter place. In 1830 he took charge of the Mount Pleasant Academy at Sing Sing, and founded a girls' school there. He died on March 27, 1856. W.F.J.

PRIME, WILLIAM COWPER, author and journalist, brother of Samuel Irenæus Prime, was born at Cambridge, N. Y., on October 31, 1825, and was graduated from Princeton in 1843. He became a lawyer, and for many years was part owner and editor of the New York *Journal of Commerce*. He wrote some charming books of travel. In 1884 he became professor of the history of art at Princeton. His works include *Boat Life in Egypt; Tent Life in the Holy Land; Pottery and Porcelain; The Owl Creek Letters; I Go A-Fishing; Coins, Medals and Seals; Along New England Roads; Among the Northern Hills*, and *Holy Cross*. Died Feb. 19, 1905. W.F.J.

PRIME MOVER. See MECHANICS, Vol. XV, pp. 782–783.

PRIME NUMBERS. See TABLES, Vol. XXIII, p. 11.

PRIMING-MACHINE, a machine for priming cartridge-shells or percussion caps. The percussion composition, in the form of a thick paste, is placed in the magazine of the machine, which is dish-shaped. The shells or caps are fed upon punches upon a horizontal rotating disk. Four tubular feeders are mounted on a rotating spindle above, moving in the direction opposite to the shells or caps. These feeders dip into the magazine in their circuit, imbibe a supply of the paste and drop it into the shell or cap as they meet in rotating.

PRIMITIVE BAPTISTS. See BAPTISTS IN THE UNITED STATES, in these Supplements.

PRIMITIVE METHODISTS. See METHODISM, Vol. XVI, p. 200; and METHODIST CHURCHES, in these Supplements.

PRIMITIVE WESLEYANS. See *Wesleyan Methodism*, under METHODISM, Vol. XVI, p. 199.

PRIMROSE LEAGUE, a league which originated in England in 1883, in memory of the Earl of Beaconsfield, and so called because on the anniversary of his death every member wears a bunch of primroses. The flower is also the badge of the league. The members, who include both sexes, are styled Knights, Dames and Associates, and their branches are called Habitations. The members of the Primrose League have taken active part in electoral campaigns and have exercised considerable influence in London and its neighborhood in favor of the Constitutional-Unionist candidates. In 1900, there were 1,710,040 members in Great Britain, divided among 2,401 habitations.

PRIMULACEÆ. See PRIMROSE, Vol. XIX, p. 756.

PRINCE, THOMAS, an American clergyman; born in Sandwich, Mass., May 15, 1687. He graduated at Harvard in 1707, and was pastor at Combs, Suffolk, England, from 1711 to 1717, when he returned to Massachusetts and became the colleague of Rev. Joseph Sewall at the Old South Church, Boston, where he remained until his death. While in England he had collected

materials for a series of volumes entitled *Annals of New England*, the first volume of which appeared in 1727, but was never completed. He devoted the last year of his life to a revision of the New England version of the Psalms. He died in Boston, Mass., Oct. 22, 1758.

E.E.T.

PRINCE EDWARD ISLAND, a province of the Canadian Dominion, and for its area the most densely populated of the confederated provinces. (For geographical location and geological description, see PRINCE EDWARD ISLAND, Vol. XIX, pp. 758–760.) It has 210 miles of railway in operation, extending from end to end of the province, and it has steamship communication with the mainland, which is kept open throughout the winter. Owing to its insular position, it enjoys a more equable climate than the adjacent provinces. The population in 1901 was 103,259. of which only 13 per cent is urban and 87 rural. Charlottetown is the capital and seat of local government; its other chief towns are Summerside and Georgetown, the population in all of which appears, in the last ten years, to be stationary. Pop. of Charlottetown (1901), 12,080.

The chief industry on the island is the fisheries, the capital engaged in which approximates half a million dollars in value. Lobsters and oysters form a considerable portion of the exports, together with mackerel, cod, herrings and smelts. The value of the total catch in 1898 was $1,070,206; of this amount a little more than half, or $536,424 worth, was exported. Prince Edward Island, says a recent writer, has a soil of great natural fertility, while for agricultural purposes the island possesses a unique advantage in immense deposits of "mussel mud"—the decayed organic remains of various kinds of shell-fish—which, in the course of centuries, has accumulated to a great depth in the bays and river mouths of the coast. Raised by dredging through the ice during the winter months, and applied to the soil, this proves a most valuable fertilizer, and adds greatly to the productive capacity of the island. Agriculture, however, forms little of an export, though cheese factories have recently been established, of which there are now 40, the output of which, in 1900, amounted to $446,054. The statistics of 1898 show that there is considerable live-stock in the province. The returns for the year were: Horses and colts, 44,060; horned cattle, 110,033; sheep, 176,800; and swine, 51,100. The religious census of the island for 1891 gives the following figures: Roman Catholics, 47,837; Presbyterians, 32,988; Methodists, 13,301; Church of England, 6,646; and Baptists, 5,749 The revenue of the province for the year 1900 amounted to $282,056; expenditure (1900), $308,494. The principal item in the revenue is the Dominion subsidy of $181,932 per annum. The Dominion Statistical Year-Book for 1899 records the debt of the province, as $500,689; the year's imports were $465,243; and the total exports $1,289,659. Prince Edward Island has only one legislative chamber — the assembly, with 30 members. The provincial executive is composed of nine members, five of whom are without portfolios. At the nominal head of the government is a lieutenant-governor. The province is represented in the Federal Parliament by five (formerly six) members, with four members in the Senate. Area of Province, 2,000 sq. miles.

PRINCE OF THE PEACE. See ALCUDIA, Vol. I, p. 417.

PRINCE OF WALES, CAPE. See ALASKA, Vol. I, p. 393.

PRINCE RUPERT'S DROPS. See GLASS, Vol. X, p. 584.

PRINCETON, a township and city, the capital of Bureau County, northern Illinois, having been founded in 1833. It is the center of a mining and agricultural region, 100 miles southwest of Chicago, and 138 miles north of Springfield, on the Chicago, Burlington and Quincy railroad. The population of the township in 1890 was 4,491; in 1900, 4,886. The population of the city in 1890 was 3,396; in 1900, 4,023. R.W.C.

PRINCETON, a village and the capital of Gibson County, southwestern Indiana, 23 miles S. of Vincennes and 27 miles N. of Evansville, on the Baltimore and Ohio and the Louisville, Evansville and St. Louis railroads. It has extensive railroad repair-shops and tile-works, flour and lumber mills and carriage-works; is surrounded by a fine wheat and grain growing country, and is an important cattle market. Pop. 1890, 3,076; 1900, 6,041.

PRINCETON, the capital of Caldwell County, western Kentucky, about 45 miles E. of Paducah, on the Chesapeake, Ohio and Southwestern and the Ohio Valley railroads. It is the seat of Princeton College, and has two flouring-mills, a woolen-mill, a carriage factory and two tobacco stemmeries. Population 1890, 1,857; 1900, 2,556.

PRINCETON, a village and the capital of Millelacs County, northwestern Minnesota, 48 miles N.W. of St. Paul and 28 miles E. of St. Cloud, on the Great Northern railroad. It has a newspaper office and a flour-mill. Population 1890, 816; 1900, 1,319.

PRINCETON, a town and the capital of Mercer County, northwestern Missouri, on the southwestern branch of the Chicago, Rock Island and Pacific railroad, 25 miles N. of Trenton and 48 miles N. of Chillicothe. It has a brewery, the Princeton Normal Institute and a cigar factory. Population 1890, 1,410; 1900, 1,575.

PRINCETON, a borough of New Jersey. It is situated on the old highway between Philadelphia and New York, which is here a beautiful wide avenue, on the south side of which extends the campus of Princeton University, and on the north side the business portion of the town. The avenue is beautifully shaded by fine elms and lighted with arc lights, and along its western portion are many residences built in the old colonial style. The battlefield is located near here, on which General Mercer fell, and the house where he died is still standing and open to visitors. Princeton is supplied with city water from drive-wells, has banks, and publishes several papers. The *Princetonian* (daily), the *Tiger* (weekly) and the *Nassau Literary Magazine* (monthly), all published by the students, are of high merit. Near the town is situated Evelyn College, an insti-

tution for women, independent in government, but having many of the instructors and courses of the College of New Jersey. Population 1890, 3,442; 1900, 3,899. See PRINCETON, Vol. XIX, p. 761.

PRINCETON, a village of Green Lake County, southeastern central Wisconsin, on the Fox River, and on the Chicago and North-Western railroad, 35 miles W. of Fond du Lac. Beans, potatoes, grain and live-stock are the chief products of the country. It contains flour, feed, planing and sorghum mills, foundries and carriage-shops. Population 1890, 986; 1900, 1,202.

PRINCETON UNIVERSITY OR THE COLLEGE OF NEW JERSEY, at Princeton, New Jersey, ranks fourth in order of founding among American colleges. It received its charter in 1746

NASSAU HALL, PRINCETON UNIVERSITY.

from John Hamilton, president of His Majesty's Council, and was the first college ever given a charter by a governor or acting governor with the simple consent of his council. The college originated in the plan "to found an institution in which ample provision should be made for the intellectual and religious culture of youth desirous to obtain a liberal education, and more especially for the thorough training of such as were candidates for the ministry." The college was opened in May, 1747, at Elizabeth, under the presidency of the Rev. John Dickinson, who died in October, and was succeeded by Rev. Aaron Burr. A second and more ample charter was granted the college in 1848, equal advantages and privileges being given to members of every denomination of Christians. On the death of its first president, the seat of the college was removed from Elizabeth to Newark, the residence of the second president, where it remained until 1757, when it was removed to Princeton on securing the erection there of Nassau Hall (named in memory of William III). This is the oldest college building, and was erected in 1756. Those who received the original charter, and who built up the college, were connected with the New York Presbyterian Synod, but no organic connection with Presbyterianism was adopted. From 1766 Presbyterians generally united in support of the college, and in 1812 the General Seminary established its Theological Seminary at Princeton, but the latter is still unconnected with the college. Nassau Hall has been famous in the historical annals of the United States. During the Revolution it was occupied by the American and the British troops as a barracks, and also as a hospital. At the battle of Princeton, Jan. 3, 1777, General Washington attacked the British, who were occupying the hall, and during the engagement a shot penetrated the walls of the hall, piercing a portrait of George III. Its place was afterward filled by a portrait of Washington, obtained with money which the General donated to the college for damages made during the war. In 1783 the Continental Congress met in the hall. In the same year the college commencement was attended by Washington and the members of Congress, this being the occasion of the presentation by Washington of the above-named donation. The benefactors of the college have been numerous and liberal. By means of donations from them, the institution has gradually extended, libraries, museums, laboratories, observatories, a commencement hall of great beauty, as well as athletic fields, having been added. The college grounds now cover 225 acres, adorned with lawns, fine old elms and handsome buildings. The dormitories are extensive and their accommodations excellent. A portion of the west wing of old Nassau Hall is used for dormitories, the other portions being occupied by laboratories and offices of the museum and instructors. It was during the brilliant presidency of Dr. McCosh that the college reached its present dimensions and importance,—a period which has brought its development up to a university status, its scope comprising departments of philosophy, language and literature, mathematics and science.

The college includes a large scientific department, known as the John C. Green School of Science. This was founded in 1873, upon a liberal endowment of John C. Green. It offers instruction in the three departments of general science, civil-engineering and electrical engineering.

The college grants degrees as follows: A.B., A.M., M.S., Ph.D., D.Sc. and B.D.; the John C. Green School of Science granting C.E., B.S., and E.E. (electrical engineer); and the honorary degrees of LL.D. and D.D. There are numerous scholarships and fellowships, and special arrangements are made for the admission of students having marked abilities, but whose means are limited. Besides the psychological and scientific laboratories, the astronomical observatories are well equipped. The university athletic field is one of the best and most perfectly kept in the country. Princeton ranks among the leaders in intercollegiate contests. The examinations are conducted on the "honor system," which puts the student entirely on his honor to be fair in his examinations. He is only required to sign a declaration that he will not seek or receive aid during his period of examination, and he is then allowed whatever other freedom he likes. The system has been found to work well, the students having a board which would promptly deal with any discovered breach of trust, but the services of the board have not been necessary since two cases, which occurred during the first year of the trial of the system. Francis Landey Patton, D.D., LL.D., was inaugurated president, succeeding Dr. James McCosh, June

20, 1888. In 1901, there were 102 instructors and 1,340 students, including some from Hawaii, India, Britain, Turkey-in-Asia, Brazil, China, Macedonia, and Germany. The library has 171,500 volumes.

Among the chief features of the college are the Cliosophic and the American Whig societies. Both possess fine marble buildings, patterned after a Grecian temple, forming the south side of the quadrangle. They have extensive libraries, and embody many of the attractions of student-life, every means being taken to foster the spirit of fraternity in its strongest form. These societies pursue courses of literary exercises, award coveted prizes for orations, essays and debates, and grant diplomas to their respective graduates. Senior and junior debates occur regularly, and are leading and exciting events of the year. On Oct. 21, 1896, Princeton celebrated its sesquicentennial, or one hundred and fiftieth anniversary of its foundation, when the college assumed the title of University. For the PRINCETON THEOLOGICAL SEMINARY, see THEOLOGICAL EDUCATION in these Supplements; see also PRINCETON, Vol. XIX, p. 762.

PRINTING. See TYPOGRAPHY, Vol. XXIII, pp. 723–757; and PRINTING-PRESSES and TYPE-SETTING MACHINES, in these Supplements.

PRINTING, PHOTOGRAPHIC. See PHOTOGRAPHY, in these Supplements.

PRINTING–PRESSES. (For the history of the invention and progress of the art of printing, in all its many departments, and a full exposition of that art, together with accurate definitions and descriptions of the phraseology of the composing-room and pressroom, the reader is referred to TYPOGRAPHY, Vol. XXIII, p. 723; and to the *Index*, under the various titles.) The evolution in the mechanics of printing has, during the past generation, been greater than ever before known in the whole history of the art. Especially is this to be noticed in the matter of presses. In order to better appreciate these remarkable developments, it will be well to trace the various stages of growth.

In the primitive Chinese method of printing, copies were obtained from the engraved blocks by merely rubbing or tapping with a stiff brush the backs of the sheet of paper to be printed. The process was necessarily very slow.

In the *Old Wine Press* of Gutenberg, the sheets were laid on by hand, and the ponderous screw turned slowly down, also by hand, to form the impression. Not more than fifty impressions could be made in an hour. The *Blaew* press of 1620 was a radical improvement, and of so marked a character that for more than a century and a half it stood alone, no attempt at advancement being made. The screw as a lever was not abandoned, but simplified, as well as the carriage. A "coffin" was built, serving as a receptacle for a stone, usually of marble, which was the bed of the old presses. The capacity of the Blaew press was about 150 impressions an hour, with two men.

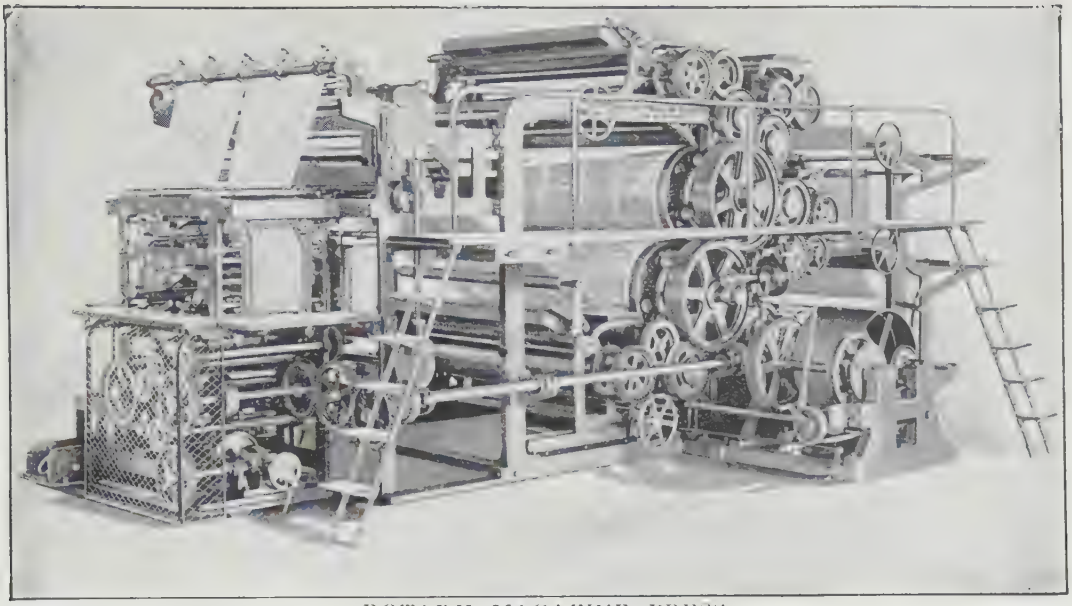
The *Stanhope* press, built in the latter part of the eighteenth century, was wholly of iron, and was immediately received by the printing world as a remarkable advance in the art of printing-press construction. It may be considered as the first real improvement upon the press as originally invented, having been preceded by an incomplete attempt in America, afterward perfected into the *Columbian* press, and also in France by a plan proposed by Annison. Its capacity was about 180 impressions an hour, with two men.

The *Franklin* press, also brought out in the latter part of the eighteenth century, was a modified form of the Blaew, and was capable of giving 250 impressions per hour. The press that was worked by Benjamin Franklin is in the Patent-Office at Washington.

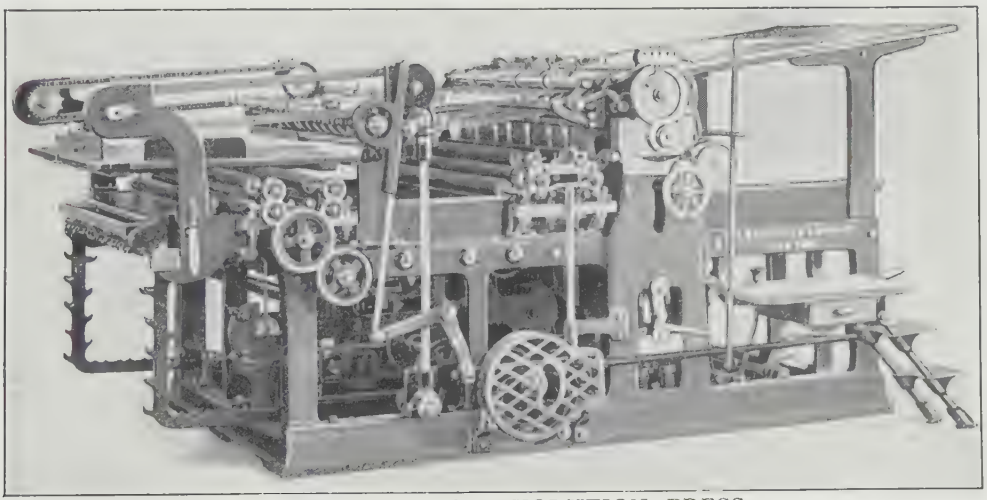
THE ADAMS PRESS. In 1824 Daniel Treadwell conceived the idea of a power-press, but was unfortunately burned out and abandoned the matter. Isaac Adams took up the work and produced a press which, while it was neither a hand-press nor a cylinder, held an important place in the printing world, The Adams had a stationary platen and a bed that did not move backward and forward. Its only movement was up, to press against the platen, and down to its former place again. This rise and fall was a considerable one, as the rollers had to pass between the form and the impression surface. The sheet was fed in from above the ends of the machine, and was taken to the point of impression upon a frisket, with a power estimated at from forty to sixty tons. Fifty-four sizes and styles were made, including two, four and six roller presses. The Adams presses were favorites for more than fifty years, and some are in use even at the present date.

The *Washington* press, invented in 1829 by Rust, was the last of the leading representative hand-presses, and the best. It is in general use to-day in the United States, and undoubtedly marks the limit of inventive genius in the line of hand-presses. It avoided the complexities of the Columbian, and, while it combined every good feature required in a hand-press, avoided all the objectionable ones. The toggle-joint, which is peculiar to this press, gives, with the minimum of exertion, a very heavy impression when desired; the parts are generally simple and easily understood. The bed slides on a track, and is, by the left hand, run in under the platen by two turns of a crank with a belt attached to its pulley. The right hand seizes the lever-handle and the platen is depressed by a compound lever acting on the toggle-joint. The platen is restored to its normal position by lifting-springs on either side. Its tympan is a frame covered with cloth and attached to the bed. It is on this that the sheet of paper is laid. A delicate frame above it, called the frisket, is folded down, holding the sheet of paper by the margin. The crank is turned, the bed run under, the impression given, the crank reversed, the tympan and frisket lifted, and while the sheet is being removed an attendant inks the form preparatory to the working of the next sheet.

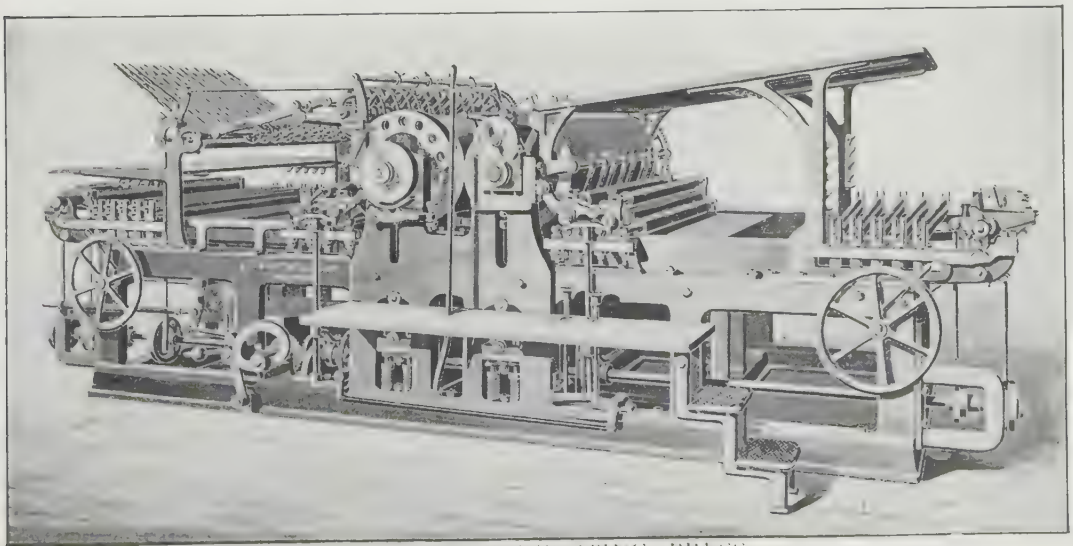
The only improvement thus far suggested is an elaboration of an idea suggested and acted upon by Dr. William Church of Connecticut, in 1821. In the press invented and manufactured by him he dispensed with the roller-boy and other hand features, accomplishing the work by mechanical ap-



ROTARY MAGAZINE PRESS



FLAT BED TWO-REVOLUTION PRESS



FLAT BED PERFECTING PRESS

pliances. He laid the sheet on the tympan and applied his hand to the rounce, by the turning of which the form was inked. Then the frisket and tympan turned down, the bed ran in, and the impression was given. A reverse of the motion reversed the process, and while the sheet was in action it prepared for the next sheet.

There is at present manufactured an excellent hand-press which has an automatic inking and delivery attachment, and is known as the "Schorn," from the inventor, T. G. Schorn of Iowa. The form is rolled during the movement of the bed forward and backward. The ink is supplied from a fountain and conducted by a feed-roller to the distributing-table, from which the form-rollers receive their supply in turn. The distribution is accomplished by angle rollers. The feed is similar to that on cylinder presses, and may be done by the pressman, or by a feeder standing on the opposite side of the press. When the latter is done, the pressman has only to run the bed in, pull the impression and run the bed out, everything else being done automatically, even to the delivery of the printed sheets. The register is equal to that of ordinary cylinder work, and the inking is far better than is generally done by hand. The attachments are manufactured for seven, eight and nine-column presses. The capacity of the press is doubled.

Job-Presses. The first step in the way of labor-saving appliances in connection with the art of printing was the treadle—a utilization of foot-power, whereby the hands were left free for other use than giving power. The treadle-machine is necessarily very different from the hand-press as previously used, inasmuch as the power is to be applied from below by the feet, instead of from above by the hand and arm.

The pioneer press of this description was invented by an American, Daniel Treadwell, who went to England in 1820 and took out a patent. It was the first of a very important series of inventions pertaining to printing, each one an improvement upon its predecessor. There was great originality in the construction of the Treadwell; its operations were conducted with much facility by one man, and as the rolling of the table and the horizontal movement of the bar were dispensed with, the labor was greatly reduced.

A general description of the principles involved in the construction and working of a treadle or job press, especially one of the present day, will show a framework with the pedal necessarily at the bottom. It is the simplest of machine-presses worked by other than hand-power. It consists of a bed for the reception of the form of type properly secured in its chase. The bed, unlike that in the hand-press, which has bed and platen both horizontal, is fixed at a convenient angle, usually perpendicular, or nearly so, while the platen, on which is placed the blank sheet or card, is at an angle convenient for examination and any needed adjustment.

The two, the bed and the platen, are like open jaws at an open angle of about fifty degrees. The form of the type secured in the chase is clamped to the bed, when the platen, by the action of the treadle, rocks on a pivot and comes into parallelism with the bed. As it approaches the type, the gearing operates a lever varying in different machines, and at the instant of absolute parallelism gives an impact of regulated strength.

The inking of the form is automatic, and is done by feeding the ink from a reservoir in the back part of the press, by a series of rollers playing on a revolving disk. The operator, while one foot is working the treadle, has both his hands for use in feeding the blank sheets or cards and taking away the printed work. The speed varies in different machines from 800 to 1,500 impressions an hour, according to the skill of the operator.

The Universal Press, invented in 1869 by Merritt Gally of New York, combines all the best features of every previously named press, with marked improvements. Simplicity of mechanism and ease of action have been studied and attained. As the Washington has for two generations been regarded as the highest type of hand-press, so the Universal, or Gally, would seem to be the highest type of treadle-press yet attained. It is adapted to the finest and most delicate kinds of printing, and can, by the change of a few screw-regulators, be converted into an embossing-press of most marvelous power.

Nearly all the manufacturers of treadle-presses have of late years added a wheel for belt-power, thereby increasing their capacity and affording a steadier working to the machine.

Cylinder Press. The first advance on the Koenig cylinder was made by Applegarth and Cowper, in 1827, 16 years after Koenig's success, when they produced an improved press for the London *Times*. It had four cylinders, and gave 4,000 to 5,000 impressions in an hour on one side of the sheet. It was regarded as a remarkable advance in the matter of presswork.

Donkin and Bacon's machine (1813) was built for the University of Cambridge. Several forms were attached on the sides of a prism, and were presented consecutively to the inking-cylinder and paper-cylinder. This machine was cumbersome and soon passed out of date. It was the first printing-machine in the world to discard the ancient hand-ball and to adopt composition inking-rollers made of glue and molasses.

Power or cylinder presses are variously designated as "single," "double," "large," "small," "drum," "stop," "double-ender," etc. The "single" cylinder is a press with but one cylinder whether "large," "small" or "drum." The "double" cylinder has two cylinders, over which the sheets of paper are fed to *one* form. The form travels under both, and each cylinder has a feed-board with an attendant, one on either side of the press. At each round trip of the bed an impression is taken from the two cylinders. An inking-fountain is provided at each end. While very popular for a time, they have yielded to improvements, and are rapidly becoming things of the past. The "small" cylinder has the circumference of its cylinder so constructed that it will cover the form complete in a single revolution. It is especially adapted for quick work. The "large" cylinder gives but a portion

of its surface to the impression of the form, a large segment being removed, which, while the cylinder revolves, permits the form to return without the cylinder being lifted. The "drum" cylinder is a single large cylinder press, bearing the name "drum" because of similarity in form to a huge bass drum. It is not very rapid, but has peculiar advantages in fine work.

The "stop"-cylinder is so arranged that the cylinder stops automatically after the sheet is printed, and remains stationary while the bed is running back, during which time a fresh sheet is placed in position.

The "double-ender" is fitted with two fountains, one at either end of the press, which supply the ink in equal quantities, and at the head and tail of the form receive exactly the same amount.

The remarkable as well as rapid development in the mechanics of the cylinder press is best shown by a comparison of the first one built in 1814 and the highest type of those built at the present date.

The *Napier* press, called in America the "Lightning" (1847), was a mammoth affair. It was simply ten presses working on one great cylinder, and was probably the largest press, or combination of presses, ever manufactured. The noise it made was terrific. The name of "Lightning" was afterward abandoned, and that of "the old thrashing-machine" substituted.

All the foregoing presses and styles of presses printed the sheet on one side only. The paper was then turned over, new forms adjusted, or another press used, and the impression for the second side taken.

In 1860, William A. Bullock of Pittsburg, Pennsylvania, built the celebrated *Bullock* press and the Cincinnati *Times* had the honor of using the first machine turned out from his shops. It was a success. In carrying into practice his plans, Bullock fed the paper from a roll containing five or six miles of linear measurement, moistened it by passing it through a spray, carried it between the impression-cylinder and the form, first for one side, then for the other, and cut the sheets at proper intervals with great precision with a serrated knife which struck the paper with lightning-like rapidity. This knife was so constructed as rarely to need sharpening.

The forms of stereotype plates were mounted on cylinders, each having its own impression-cylinder and inking-apparatus. The roll of paper having been mounted in its place, the machinery was started and the paper unwound as fast as needed. In the earlier presses the sheets were automatically delivered on the receiving-board at the rate of 11,000 finished sheets an hour. By a most unhappy accident the celebrated inventor lost his life by being crushed in his own machinery, and a gloom fell on the printing world.

The Web Perfecting-Press. The history of the web perfecting-press begins in 1835, when Sir Rowland Hill, who became famous for his advocacy of penny postage in Great Britain, obtained letters patent for a web perfecting-press; that is, a press capable of printing from a roll of paper on both sides and cutting and folding the sheets.

The roll is one continuous sheet of paper, varying in length from three to nine miles, and of a width required by the size of the sheet to be printed. It is so compactly wound that it is easily handled, and, when placed in its bearings at the end of the press (or sometimes above it), uncoils very readily, being fed into the machine at any speed required.

In some presses the roll is cut into sheets before being fed to the forms; in others, the cutting is not done until after the final impression, and just previous to entering the folder.

The Serrated Blade. In 1853 Victor Beaumont of New York patented the serrated cutting-blade, set lengthwise in one of a pair of cutting-cylinders, having elastic surfaces inserted to hold the paper on each side of the cutting-blade when the sheet was cut from the web. To this device is largely due the success of all web printing-presses.

The Victory. This machine was invented in 1877 by Messrs. Duncan and Wilson of Liverpool, England. While it was generally built on the same principle as the Bullock, yet there were many important variations, and an added advantage in the facilities for folding the sheets as they left the press. It would print, cut, fold and deliver 8,000 complete papers per hour, of an eight-page paper fifty inches square; or print, cut, fold and paste at the back 7,000 24-page sheets per hour.

Ingram Illustrated-Work Printing-Machine. In 1877, William J. Ingram, son of the founder of the *Illustrated London News*, secured a patent for an invention on a web printing-machine, whereby the sheet was fed into the mechanism, receiving the first imprint from the letterpress form; thence it was carried diagonally downward to the picture-cylinder, which printed the illustrations on the other side. A species of guillotine cut off the sheets at the proper places, whence they were carried to the folding-machine. The finished papers were delivered at the rate of 6,500 an hour.

It has always been found, in practice, that cuts or engravings require much more careful inking than the letterpress, and that the ordinary inking-arrangements, which are found to answer very well for letterpress, will give but very imperfect work from engravings or cuts. It has been found wellnigh impossible to obtain satisfactory impressions from cuts or engraving-plates bent to the sharp curve required to correspond to printing-cylinders of the ordinary size.

These difficulties were overcome by increasing the diameter of the cylinder on which the plates for the cuts were placed, so that the curves to which the cuts or engravings were fitted might be gentler and of longer radius than the curve of the other printing-cylinders.

In 1878 there was built by Ingram, and exhibited at the Paris Exposition, a second machine, which had the cylinders of such size that three whole sheets could be printed at each revolution. The curvature of the plates was so slight that the printing was regarded as fully equal to that done on the ordinary flat surface.

The Campbell Web Perfecting-Press. In 1876, Andrew Campbell of Brooklyn, New York, con-

tracted to build for the Cleveland *Leader* a press from which twelve thousand copies could be printed in an hour, and constructed the first press that printed, inserted, pasted, folded and cut in one continuous operation.

A second press was built on the same pattern and exhibited at the Centennial Exposition of 1876. It was afterward erected in an office in Jersey City, where it is still at work. The machine is remarkably simple in construction. The type-cylinders, with their corresponding impression-cylinders, are placed in a perpendicular plane. The sheet is fed in at one end; it passes between the respective pairs of cylinders, and is then carried over an archway to the folding department, where it passes downward by successive stages until it reaches the delivery-board, folded and ready for the carrier.

The archway referred to is for the special purpose of giving easy access to the interior parts of the machine, as well as to the outer parts. It readily permits a man to stand up and work without injury while the press is in operation.

Only two of these presses were ever built, and both are still in use. Costly litigation was entered into against Campbell by the Hoe Manufacturing Company, which resulted in the company's purchasing of Campbell's patents and then shelving them.

This press is a marvel of simplicity and easy manipulation. The cylinders are very small, the parts few and the feeding of the web so gauged that the machine performs the best work with the least friction, noise and inconvenience.

The Scott Web Perfecting-Press. In 1879 Walter Scott of Chicago concluded to take up the Bullock where the ill-fated inventor and his able assistant had left off, and built a machine in Chicago with a capacity fifty per cent greater than any of its predecessors. He improved upon his own improvements, and in 1881 produced a press that would feed, print, cut, fold and deliver thirty-two thousand eight-page papers inside of sixty minutes.

The Scott press of 1890 is regarded as combining all the best features of any and every machine yet put before the public. The folding-appliances are especially simple and complete, and with a minimum of parts in general, the machine produces the maximum of results.

Mammoth Presses. The desire to build single machines that will produce the greatest number of papers in a given time has led to the construction, by various manufacturers, of "quadruple" and "sextuple" presses. They are simply machines of mammoth proportions, or, like the ten-cylinder rotary press invented by Napier and culminating in the once-celebrated Hoe Lightning, consist of a multiplication of cylinders and forms in the same general framework.

The largest machines of this kind are popularly designated as "Jumbos," and are simply mammoth in their construction. A press of this kind weighs about fifty-eight tons. It is ordinarily fed by three rolls of paper, each of 63 inches width. When under way the machine runs at the rate of fifty miles of white paper in an hour, and will print, cut, fold and deliver 144,000 four-page papers in an hour.

While these monster presses perform prodigies of successful work, the slightest difficulty in any one part serves to paralyze the whole of the machinery, causing an uncomfortable delay, hence they are by many regarded with disfavor.

PRISM. See Light, Vol. XIV, p. 596.

PRISMOIDAL FORMULA. See Mensuration, Vol. XVI, p. 32.

PRISONS were once places of detention, where the accused or the convicted awaited final disposition. In time, imprisonment came to be in itself a punishment, the term of sentence measuring the turpitude of the offense. This stage in prison evolution is followed by another, in which the prison becomes a moral hospital for the curable, an asylum for the incurable. So is the history of prisons, in their purpose, written in outline; so, also, is written the history of prison architecture and criminal jurisprudence: for the prison-house has grown from a single cell, cage or dungeon into an educational institution; and a code of prevention is coming to take the place of a code of retribution, but only in a few localities and institutions has the evolution proceeded so far.

In the United States, where, shortly after the adoption of the Federal constitution, the penitentiary system "received its earliest and best expression," the history begins with the second stage, in which prisons are used chiefly, though sparingly, as a means of punishment, with laws that seek to adjust the penalty to the crime, that the sense of justice may be satisfied, the criminal himself deterred from further crime and others warned by his punishment. For the most part, the prisons and jails of the United States are still serving the same purpose. Reformatory influences are more generally employed; but it is nevertheless true, in spite of the reforms in which the United States have been foremost, in spite of the protest of our penitentiary system against the old penal theory, retribution in letter, if not in spirit, is the corner-stone of our criminal codes.

There are as many codes as states. No two codes agree throughout, either in the definition of crime or in the penalties prescribed for them, and these varying definitions and penalties not only reflect the varying conceptions of the relative seriousness of different crimes among different communities, but also show the sincerity of the effort on the part of law-makers to suit the punishment to the crime. This is certainly very generally true with respect to adult criminals of supposed sound mind. Children and defectives are usually dealt with on another principle. But for adults the breaking of law, if detected, must be punished by a sentence, within certain limits, in time, or by fine, or by both.

Many state institutions, and most jails and minor prisons, reflect the law in the treatment of prisoners, who are regarded, primarily, not as candidates for reformation, but as subjects for punishment. One authority speaks of county jails as "moral pesthouses, mere nurseries of infamy, where, without regard to age, sex, offense or sanitary laws, unfortunates are indiscriminately impounded."

There are notable exceptions, and it is pleasing to record that there is rapid progress in the adoption of a criminal code which recognizes the reformation of the convict as one of the primary objects of his separation from society, and which makes his social or antisocial attitude, his fitness for liberty, the determining factor in considering his return to society again. These principles were first notably employed in the state of New York, where there has been developed a remarkable institution, known as the Elmira Reformatory, under a law providing that individuals "of the age of 16 to 30 years, who are not known to have been previously sentenced to state's prison, may be sent to that institution for a term of imprisonment to be determined by the managers of the reformatory, but not to exceed, in any case, five years." The basic principle of this institution is the belief that criminals can be reformed, and that every prisoner must receive special treatment according to his need. The reformatory is educational in all its functions, seeking to develop every faculty of soul, mind and body. The reports of the institution show a probably complete reformation of over eighty per cent of those who are committed to it.

There are other institutions of this type, in the different states, at present—notably one for women at Sherborn, Massachusetts—and the system, in principle, has been adopted by Massachusetts, Pennsylvania, Ohio, Michigan, Illinois, Minnesota, Kansas and Colorado. Indeed, the principle of indeterminate sentence has now, in New York and Illinois, been carried to its logical limit, in that judges are deprived of the power of fixing even a maximum in pronouncing sentence.

In the United States there are 68 Federal and state prisons and penitentiaries, in few of which these principles have been applied, and nearly two thousand five hundred county jails, in most of which reformatory efforts are probably not attempted nor even possible. From these statistics the present status of prisons and prison discipline can be easily imagined.

The statistics presented in the different census reports seem to indicate an increase in the amount of crime. According to the latest census there were, in 1890, in all the prisons of the United States, 83,329 prisoners, as follows: In state prisons and penitentiaries, 45,233; in county jails, 19,861; in city prisons, 3,264; in workhouses and houses of correction, 9,968; leased out by counties, 2,308; in military and naval prisons, 794; in hospitals and asylums for the insane, 901. This is an increase of 23,720 over the reported number in 1880,—an increase in ratio from 1,169 to 1,000,000 of population in 1880 to 1,315 in 1890. It should be noted, however, that these figures do not make it certain that there has been an actual increase in the ratio of crime, nor that there has not been an even greater increase, for the reason that there are other elements in the problem affecting the result, such as changes in the laws, the varying interpretation and enforcement of these laws with the changing personnel of the courts, the varying efficiency of the police, etc. The census authorities warn against comparisons with the reports of earlier decades, which many writers have drawn to show an alarming increase. The enumeratiom of the prison population prior to 1880 was very imperfect.

Attention should be called, also, to the fact that while the ratio of foreign-born whites to the total population is 16.59 per cent, the ratio of foreign-born white prisoners to the total number of prisoners is 27.8 per cent. Some of our penologists have placed as first among the causes which tend to promote the increase of crime, unrestricted immigration.

The state prisons and penitentiaries are most advanced in point of architecture and discipline. While the Old World was the birthplace of the penitentiary, it was in the United States that the idea was first and most satisfactorily expressed in a system. There are two systems of penitentiary discipline, known the world over as the Pennsylvania and Auburn, the first providing for the solitary confinement of the prisoner at hard labor, the latter providing for the separation of the prisoners by night only, and for their employment in shops together, but in silence, during the day. There are few, if any, penitentiaries distinctively of the first type in the United States to-day, though solitary confinement is employed at times in many of them as a special means of discipline. The Auburn system, with modifications, is in vogue in most penitentiaries. Out of these two systems has grown the Elmira system, noted above.

County jails and other minor prisons are, for the most part, poorly planned and poorly governed; their maintenance is expensive, and it is impossible to furnish employment, except in very limited amount and of trifling sort. The average number of inmates in a county jail is less than five, and many of these jails are nearly always empty. When the last census was taken, 589 of 2,460 jails were without occupants. Many of these jails are pretentious buildings, and costly residences are usually provided for the sheriffs. Most of the jails are so built as to make the separation or classification of the inmates impossible, and even in some cases to prevent the separation of the sexes.

In two states there are no penitentiaries or state prisons, the convicts being confined in camps, where they are employed by contractors under lease; in four other states, few of the convicts are kept within penitentiary walls, the rest being leased. The lease system, which has been attended by great cruelties, and by conditions which interfere with true reformatory work, is being gradually supplanted.

About two thirds of the total number of prisoners in the United States are reported as being employed while in prison. The chief occupations are making boots and shoes, clothing, furniture, chairs, wagons, barrels, brooms, brushes, agricultural implements, carpentering, mining, building railroads, stone and iron work, saddlery and farming.

The average age of prisoners is 30.65 years. About 75 per cent have no trade, and about 24 per cent can neither read nor write. See also PRISON DISCIPLINE, Vol. XIX, pp. 766–784.

JOHN H. FINLEY.

PRISTIDÆ OR PRISTIS. See ICHTHYOLOGY, Vol. XII, p. 724. RAY, Vol. XX, p. 311.

PRIVATE SCHOOLS. See SCHOOLS, PRIVATE, in these Supplements.

PRIVY SEAL. See MINISTRY, Vol. XVI, p. 495.

PRIZE-FIGHTING. See WRESTLING AND BOXING, Vol. XXIV, p. 726; and PUGILISM, in these Supplements.

PRJEVALSKY, NICOLAI MICHÆLOVITCH. See PREJEVALSKY, in these Supplements.

PROA, a narrow canoe thirty feet long and three feet wide, used by the natives of the Ladrone Islands. The stem and stern are similar, the boat sailing either way. The lee side is flat, so that the canoe resembles half of a vessel divided vertically in the line of the keel. Extending to leeward is an outrigger, consisting of a frame, at the end of which is a floating canoe-shaped timber, which prevents the narrow proa proper from tipping.

PROBATE. See WILL, Vol. XXIV, p. 601.

PROBOSCIDEA, a family of insects. See DIPTERA, Vol. VII, p. 223; and MAMMALIA, Vol. XV, pp. 429–430.

PROBOSCIS MONKEY. See APE, Vol. II, p. 133.

PROCARP, a name given to the peculiar female organ of the red seaweeds (*Florideæ*), in which no gamete (*oösphere*) is differentiated; also called *carpogonium* or *carpogone*.

PROCEDURE. See EVIDENCE, Vol. VIII, p. 647; LAW, Vol. XIV, p. 359; and PLEADING, Vol. XIX, p. 229.

PROCELLARIDÆ, a family of birds of the order *Tubinares*, which comprises the tubenosed water-birds. They are gull-like pelagic birds. The family includes the petrels and the albatrosses. There are about ninety species in all the seas.

PROCESSION OF THE HOLY SPIRIT, a dogma disputed between the Eastern and Latin churches, arising out of the introduction of the words *filioque* into the Nicene Creed. See GREEK CHURCH, Vol. XI, p. 139.

PROCLUS, a philosopher. See NEO-PLATONISM, Vol. XVII, p. 347.

PROCNE. See NIGHTINGALE, Vol. XVII, p. 512.

PROCONSUL. See CONSUL, Vol. VI, p. 280.

PROCRUSTES. See THESEUS, XXIII, p. 315.

PROCTOR, REDFIELD, legislator; born in Proctorsville, Vt., June 1, 1831; was graduated at Dartmouth College in 1851, and at the Albany Law School, and practiced for a time. He served as lieutenant to colonel through the Civil War in the Union army; was a member of the Vermont legislature in 1867, 1868, and 1888; a member and president *pro tem.* of the state senate in 1874–75; lieutenant-governor of Vermont in 1876–78; and governor in 1878–80. In 1889–91 he was Secretary of War; in the latter year became United States Senator, and at the end of the term was re-elected. In 1898, after visiting Cuba, he made a notable speech on the reconcentrados.

G. J. H.

PROCTOR, RICHARD ANTHONY, an English scientist and popular writer on topics of astronomy; born in Chelsea, England, March 23, 1837. When eighteen years of age he entered London University and a year later St. James College, Cambridge, where he devoted himself to mathematics and theology. After leaving the university, in 1860, he studied law and practiced that profession a few months, abandoning it for the study of mathematics and astronomy. In 1865 he published *Colours of Double Stars*, in *The Cornhill Magazine*, and later in the same year he brought out his celebrated monograph, *Saturn and His System*, a work that, although it had a very small sale, marked him as an authority in the science of astronomy. A year later he published his *Handbook of the Stars*, and this was followed by *Constellation Seasons* and *Sun Views of the Earth*. In 1868 *Half Hours with a Telescope* was given to the public. This was very well received and has gone through many editions. In 1873 and 1879 he made very successful lecture tours in the United States, and in the latter year he also visited the Australasian colonies, lecturing extensively. In 1881 he founded in London a weekly publication called *Knowledge*, which was later converted into a monthly. In 1887 he settled in Orange Lake, Fla., but on September 12, 1888, while on his way to England, died of malarial hæmorrhagic fever in New York city. His unfinished book on *The New and Old Astronomy*, designed to embody the studies of his life, was completed by Arthur Cowper Ranyard and published in 1892. He also wrote *Other Worlds than Ours* (1870); *Star Atlas* (1870), and *Light Science for Leisure Hours* (1871).

RICHARD A. PROCTOR.

R. W. C.

PROCURATOR. See PROCTOR, Vol. XIX, p. 813.

PROCYONIDÆ. See MAMMALIA, Vol. XV, p. 447.

PROFILOMETER, an instrument used for measuring the face, consisting of parallel rods bound in a frame so that they may be slipped in and out.

PROFITS. See POLITICAL ECONOMY, Vol. XIX, p. 380.

PROFIT-SHARING. See CO-OPERATION, Vol. VI, p. 302.

PROGRESSION. See ALGEBRA, Vol. I, p. 473.

PROGRESSIVE FRIENDS. See FRIENDS, SOCIETY OF, in these Supplements.

PROHIBITION LAWS. See LIQUOR LAWS, in these Supplements.

PROHIBITION PARTY. Although the temperance movement began in the United States as early as 1812, it was not till about 1851, when the famous "Maine Law" was passed, that prohibition

became prominent. The example set by Maine was quickly followed by Vermont in 1852, Rhode Island in 1852, Connecticut in 1854, New Hampshire in 1855, New York in 1855, Michigan in 1855, Iowa in 1855—a belt of states settled almost exclusively by New England people. Some of these states, as Rhode Island, New York, Connecticut and Michigan, subsequently repealed their laws; but the idea was started and grew slowly, but surely, as a state issue. After the war the movement became especially active, and prohibition parties began to appear in several states.

The first step toward a national party was taken at a convention of the Right Worshipful Grand Lodge of Good Templars, held at Oswego, New York, May 25, 1869, where a committee was appointed to call a national convention of prohibitionists. This convention met at Chicago, Sept. 1, 1869, and founded "The National Prohibition Reform Party." The first national convention was held at Columbus, Ohio, Feb. 22, 1872, where James Black of Pennsylvania was named for President and John Russell of Michigan for Vice-President. Nine states were represented by 194 delegates. At the election in November 5,608 votes were polled.

From this humble beginning the party has steadily grown. In 1876 it nominated Green Clay Smith, and polled 9,522 votes. In 1880 Neal Dow received 10,305 votes in eighteen states. The strength of the party then lay in Ohio, Pennsylvania and New York, in the order mentioned. But 380 votes were cast for it west of the Mississippi, and but 308 south of Pennsylvania and the Ohio River. But in the general breaking up of parties and the rise of new issues which marked the years 1880 to 1884, the Prohibition party gained immensely. It now declared for woman suffrage, and at the national convention held July 23–24, 1884, at Pittsburg, admitted women delegates. John P. St. John of Kansas and William Daniel of Maryland were nominated on a platform demanding the abolition of the collection of revenue from alcoholic liquor and tobacco; that the liquor traffic be prohibited in all places over which the government has control; and that no new state be admitted to the Union unless its constitution prohibit polygamy and the manufacture and sale of liquor. The vote polled was 150,369 in 34 states.

The party strength now lay in Massachusetts, New York, Pennsylvania, Kansas and Illinois, in the order in which they are named.

When 1888 came, the party, more prosperous than ever, held a national convention at Indianapolis, May 30th; nominated Clinton B. Fisk of New Jersey and John A. Brooks of Missouri, and added to its old platform a demand for woman suffrage, reform of the immigration laws and the protection of the American Sunday. The vote polled was 250,290, South Carolina being the only state in the Union wherein no votes were cast for Fisk. The strength of the party was now in the Northwest; it was a strong third party, outranking the Labor party in votes. In 1892 the convention sitting at Cincinnati chose John Bidwell of California and James B. Cranfill of Texas as its candidates, and polled 279,191 votes. Its platform was made up of issues of the day, as government ownership of railways, revision of the immigration laws, prohibition of alien ownership of land, female suffrage, the Australian ballot, and, of course, no liquor traffic.

The seventh national convention met in Pittsburg, Pennsylvania, May 27–28, 1896. There were two factions, known as "narrow-gauge" and "broad-gauge," composed respectively of those who favored a platform which would have but a single plank, the prohibition of the liquor traffic, and those who were of the opinion that the party should take into account the various political and socialistic differences at the time, including the doctrine of free silver. The "narrow-gauge" men made up three fourths of the eight hundred delegates, and therefore prohibition was made the only issue of the platform. Two hundred of the opposing faction then "bolted" the convention and organized themselves into the "National Party" in another hall. The Prohibitionists proper then nominated Joshua Levering of Maryland for President and Hale Johnson of Illinois for Vice-President. The "National Party," adopting a platform which advocated, in addition to prohibition, free silver, abolition of banks, government ownership of railways, etc., nominated Charles E. Bentley of Nebraska and J. H. Southgate of North Carolina. In the election which followed in November, the Prohibitionists polled 130,560 votes and the "National Party" candidates 14,392 votes. The regular Prohibition party in 1900 nominated John B. Woolley, of Illinois, for President and Henry B. Metcalf, of Rhode Island, Vice-President. Vote polled that fall, 208,833. Nominees in 1904 were Silas C. Swallow, of Pennsylvania, President, and Geo. W. Carroll, of Texas, V. P.

PROJECTILES. See GUNNERY, Vol. XI, p. 271; and GUNNERY, in these Supplements.

PROMISE. See CONTRACT, Vol. VI, p. 286; and AGREEMENT, in these Supplements.

PROMISE, BREACH OF. See WOMEN, Vol. XXIV, p. 677.

PROMISSORY NOTE. See BILLS OF EXCHANGE, Vol. III, p. 582.

PROMORPHOLOGY. See MORPHOLOGY, Vol. XVI, p. 870.

PRONUNCIATION. See GREECE, Vol. XI, p. 121; LATIN LANGUAGE, Vol. XIV, p. 331; and *Phonology*, under PHILOLOGY, Vol. XVIII, pp. 800–801.

PROOF OF FIREARMS. With a view to the public security, the proving of all barrels for English small arms is rendered compulsory at the proof-house of either London or Birmingham. The proof consists in firing them with heavier charges than they are made for. Rifle-barrels are proved twice: 1. After boring, with three times the ordinary charge of gunpowder, and a heavy bullet; and 2. After rifling, with the lock attached, the charge being reduced one third. When the rifle is quite complete it is again tested with its proper charge. Ordnance is submitted to a very searching proof by firing very heavy and gradually increasing charges. In America they are subjected to severe proof tests.

PROOF-READERS' MARKS, corrections indicated for the printer, on proof-sheets, which may be said to consist of two parts: 1. The body of type, which is to be corrected; and 2. The broad white margin, on which the corrections are marked. The technical marks employed to correct errors by compositors have been the same from the infancy of the art of printing until the present day, and by long use have approved themselves to all who read for the press. There are few industrial occupations demanding more exacting application than proof-reading. There can be none in which wide reading and general knowledge are more useful. But qualities more than these are required to make a good proof-reader. In the first place, a practical knowledge of the whole of the art of printing is almost a *sine quâ non.* The discernment of bad style, of wrong use of type, and a myriad matters also, can only be acquired by long practical training in a printing-office. Here a proof-reader's work is long, trying to the eyes, and exhaustive of nervous energy, even if it be well paid. Many a scholarly man at such a task might exclaim with one poetic corrector:

"Oh, but to '*dele*' work!
To 'transpose' toil for rest!
To 'make up' life's remaining years
On smiling Nature's breast!
A 'space' of time to join the 'chase,'
Some 'quoins' to see me through;
A short 'fat take,' at least, I want,—
A few small 'notes' might do."

It would tax the limits of an encyclopædia article, and transgress the province of a technical work, to attempt to explain all the details of the art of printing under the present title. Necessarily required to be understood by a practical and professional proof-reader, they are outside the province of the author or business man finally revising proof for the printer. In such a case the matter has, in most instances, already passed through the hands of an expert proof-reader before it reaches the author. The latter, desiring to make further changes or corrections, requires merely such a superficial knowledge of proof-reading and a familiarity with the technical signs, symbols, abbreviations, and contractions employed as will enable him to express his desires in form intelligible to the printers charged with giving effect to them. For such a one this article and its sample proof-sheets are intended.

A proof comes from the printer in "galley" form, having in the top right-hand corner its consecutive number, and with it printers usually send printed directions to non-professional proof-readers, in terms like the following:

1. Read carefully, ESPECIALLY for errors in NAMES, ADDRESSES, and technical words.
2. Return the ORIGINAL COPY with the proof.
3. Write on proof order for NUMBER OF COPIES WANTED, if not already given.
4. Mark "O.K.," or "O.K. with alterations," as the case may be, signing your name, so we may know that proof has reached the proper person.
5. Don't send verbal explanations by message-boy when it is possible to write them.

An observance of these few hints will prevent most of the errors likely to occur.

Such a proof-sheet as No. 1, following, necessarily has to carry far more errors than usual in any well-composed or corrected proof reaching an author, in order to exhibit the methods of correction. Proceeding to consider and correct the errors in sequence and detail, it may be, in the first place, remarked that there are two general classes of correction-marks: 1. Those marked in the body of the type, to point out the exact location of any needed correction; 2. Those written in the margin, to show the nature of the correction desired to be made. In their turn, each of these is subdivided; the marks inserted in the type comprising,—*a.* Strokes drawn through letters, words, or marks of punctuation; *b.* Carets and inverted carets; *c.* Horizontal curves; and *d.* Underscoring with lines and dots. The signs used in the margin may be classified as,—*e.* Words, letters, punctuation, etc., that are intended to take the place of errors in the type, or to supply omissions; *f.* Abbreviations of such terms as "transpose," "wrong font," etc.,— words which indicate to the compositor the kind of error that has been committed; and *g.* Certain conventional signs which have come down from the early days of the art of printing. These two classes of signs should always be used in conjunction. Every error marked in the type must have a corresponding mark in the margin, to attract the compositor's attention. No mark should be made in the margin which has not some corresponding mark in the type. But the two classes of marks must be kept in their proper places. In the type are to be placed *only* those marks which indicate the place at which an error has been made. The margin is reserved for marks denoting the nature of the desired correction.

Though the errors which are possible of occurrence in the setting of type, whether from poor copy or careless or incompetent compositors, are numerous, all, or nearly all, of them may be classified and arranged under the following heads: 1. The need of insertion of new or omitted matter; 2. The expunging or striking out of letters, signs, or matter improperly inserted; 3. The substitution of other letters, signs, or matter in the place of errors; 4. Transposition; 5. Inversion; and 6. Spacing.

The errors, and method of correcting them, are illustrated in plate No. 3. In the explanation which follows, the numbers which stand at the heads of paragraphs refer to the corresponding numbers in the plate.

EXPLANATION OF THE CORRECTIONS. Line 1. The centering of a heading. *In the type:* The sign], drawn approximately where the end of the heading should come, with the open side of the sign toward the type. *In the margin:* The word "center."

Line 2. The use of an ornament too small to conform to good style. *In the type:* A horizontal line under the ornament. *In the margin:* The words "larger ornament." The use of an ornament in line 5 requires a distinction in size.

Line 3. The use of a heading too small in type-size, in proportion to the size of the page. *In the type:* The type underscored by a single horizontal line. *In the margin:* The word "larger," or specific and technical description of the size and face of type desired,— for the latter a knowledge of printing is necessary.

NO. 1.— UNCORRECTED PROOF.

SPECIMEN-SHEET.

POETS, SAGES, WARRIORS.

[*Uniform with The Historians Seriss.*]

Sage of Concord (The), RALPH WALDO EMER SON, Boston, United States, author of *Literary Ethics* (1838), *Poems* (1846), *Representative Men* (1850), *English Traits* (1856), and numerous other works (1803-1882)

"In Mr. Emerson we have a poet and a profoundly religious man who is really and entirely undaunted by the discoveries of past, present, or prospective, science. In his case, poetry, with the joy of a bacchanal, takes her graver brother science by the ɥand, and cheers him with immoral laughter.

By Emerson scientificconceptions are continually transmuted into the finer forms and warmer lines of an ideal world." PROFESSOR TYNDALL, *Fragments of Science.* "No one who has conversed with the Sage of Concord can can wonder at the love which his neighbors feel for him, or the reverence is regarded by the scholars of England and America."—*News-paper Biographical Sketch*, May, 1879.

Sage of Monticello (*The*), Thomas JEFFERSON, the third president of the Uneted States, whose country seat was at Monti cello.

As from the grave where Henry sleeps,
From Vernon's weeping willow,
As from the grassy pall which hides
The Sage of Monticello,
* * * * * *
Virginia, o'er thy land of Slaves,
A warning voice is swelling.
WHITTIER, *Voices of Freedom* (1835).

NO. 2.— CORRECTED AND REVISED PROOF.

SPECIMEN-SHEET.

POETS, SAGES, WARRIORS.

[Uniform with the Historians Series.]

Sage of Concord (*The*), RALPH WALDO EMERSON, Boston, United States, author of *Literary Ethics* (1838), *Poems* (1846), *Representative Men* (1850), *English Traits* (1856), and numerous other works (1803–1882).

"In Mr. Emerson we have a poet and a profoundly religious man, who is really and entirely undaunted by the discoveries of science, past, present, or prospective. In his case, poetry, with the joy of a Bacchanal, takes her graver brother science by the hand, and cheers him with immortal laughter. By Emerson, scientific conceptions are continually transmuted into the finer forms and warmer lines of an ideal world."— PROFESSOR TYNDALL, *Fragments of Science.*

"No one who has conversed with the Sage of Concord can wonder at the love which his neighbors feel for him, or the reverence with which he is regarded by the scholars of England and America."—*Newspaper Biographical Sketch*, May, 1879.

Sage of Monticello (*The*), THOMAS JEFFERSON, the third President of the United States, whose country seat was at Monticello.

"As from the grave where Henry sleeps,
From Vernon's weeping willow,
And from the grassy pall which hides
The Sage of Monticello, . . .
Virginia! o'er thy land of slaves
A warning voice is swelling."
WHITTIER, *Voices of Freedom* (1835).

Line 4. Italics to Roman. *In the type:* One line under the words to be changed. *In the margin:* The abbreviation "Rom."

Line 6. Change of font. *In the type:* A stroke under or through the letter or word to be changed. *In the margin:* The abbreviation "w.f." ("wrong font"). The letter g in the word **Sage** is lighter-faced than the other letters, as will be seen by comparison.

Roman to Italics. *In the type:* One line under the word to be changed. *In the margin:* The abbreviation "Ital."

The insertion of an omitted hyphen. *In the type:* A caret, ∧, at the point where the correction is desired. *In the margin:* A hyphen between slanting strokes; thus, //.

Lines 7–8. The insertion of an omitted "lead." *In the type:* A caret, <, the apex pointing between the lines where the lead has been left out. *In the margin:* The abbreviation "ld.," for lead, written in the angle of the caret.

Line 9. The substitution of a perfect for a defective type. *In the type:* A line under or through the defective letter. *In the margin:* A small cross, x.

Line 10. The insertion of an en-dash instead of a hyphen between connected and inclusive dates. *In the type:* A stroke through the hyphen. *In the margin:* An en-dash between slanting lines; thus, //. For greater certainty as to the kind of dash desired, most proof-readers write "en-dash" as well.

The insertion of an omitted period. *In the type:* A caret, ∧, at the place of omission. *In the margin:* A period encircled by a ring; thus, ⊙.

Line 11. Indenting for a paragraph. *In the type:* A caret, ∧, at the place where the indentation is to be made. *In the margin:* A square, □ Another marginal sign for a paragraph is made thus: ¶.

Lines 11–12. The wrong division of a word. *In the type:* A stroke through the letters out of place and a caret, ∧, where they should be inserted. *In the margin:* The *dele*, or sign of omission, δ (the *dele* — a Latin imperative meaning "destroy" — is made in a variety of ways, all resembling, in some degree, the Greek letter δ), and the expunged letter or letters inserted opposite its appropriate line, followed by a slanting stroke.

Line 12. The correction of improper spacing between words or letters. *In the type and margin:* Inverted carets, ∨ ∨ ∨.

Line 13. A transposition desired. *In the type:* A circle is thrown about the word, and a line carried between the type lines to a caret at the point where the insertion is to be made. *In the margin:* The abbreviation "tr."

To transpose two words. *In the type:* A line passed over the first word and under and around the second. *In the margin:* The abbreviation "tr."

Transposing letters. *In the type:* A line under the letters to be transposed. *In the margin:* The abbreviation "tr."

Changing the order of several words. *In the type:* Numbers placed over the words to be transposed, so as to indicate the order in which they are to be arranged. *In the margin:* The abbreviation "tr."

In transposing letters a curved line is sometimes passed above the first and below the second.

Change of punctuation. Comma to period. *In the type:* A stroke through the comma. *In the margin:* A period inclosed in a circle. Period to comma. *In the type:* A stroke through the period. *In the margin:* A comma, followed by a slanting stroke.

Line 14. Depressing a space. *In the type:* A line through the space. *In the margin:* A vertical dash resting on a shorter horizontal dash (or semicircle). ⊥ ⊥. (Spaces and quads (or quadrats) are pieces of type-metal used to space out the lines of type. Although not as high as the pieces bearing the type-faces, they sometimes are elevated so as to appear in the proof.)

NO. 3.—PROOF-SHEET AS CORRECTED BY PROOF-READER.

SPECIMEN-SHEET.]

POETS, SAGES, WARRIORS.

[*Uniform with The Historians Series.*]

Sage of Concord (The), RALPH WALDO EMERSON, Boston, United States, author of *Literary Ethics* (1838), *Poems* (1846), *Representative Men* (1850), *English Traits* (1856), and numerous other works (1803–1882).

"In Mr. Emerson we have a poet and a profoundly religious man who is really and entirely undaunted by the discoveries of past, present, or prospective science. In his case, poetry, with the joy of a bacchanal, takes her graver brother science by the hand, and cheers him with immoral laughter.

By Emerson scientific conceptions are continually transmuted into the finer forms and warmer lines of an ideal world." PROFESSOR TYNDALL, *Fragments of Science.* "No one who has conversed with the Sage of Concord can can wonder at the love which his neighbors feel for him, or the reverence is regarded by the scholars of England and America."—*Newspaper Biographical Sketch*, May, 1879.

Sage of Monticello (*The*), Thomas Jefferson, the third president of the United States, whose country seat was at Monticello.

As from the grave where Henry sleeps,
From Vernon's weeping willow,
As from the grassy pall which hides
The Sage of Monticello,

Virginia, o'er thy land of slaves,
A warning voice is swelling.
WHITTIER, *Voices of Freedom* (1835).

Change of type. Lower-case to capital. *In the type:* A stroke through the letter to be changed. *In the margin:* The abbreviation "cap," or the letter with three lines thereunder and a slanting line; thus, ⫽. (Small letters are called, by printers, lower-case letters; capitals and small capitals, upper-case letters. A change from upper to lower case is indicated by underscoring once the word in the type and writing the abbreviation "l.c." in the margin. The common method of indicating a change from a lower to an upper-case letter is to draw a line through the letter in the type, and to place in the margin the same letter underscored twice for small-capitals and thrice for capitals. See also line 24.)

Line 15. A letter inverted. *In the type:* A stroke under the inverted letter. *In the margin:* The inversion-sign, ℴ.

Line 16. The insertion of an omitted letter. *In the type:* A caret, ∧, showing the point at which the letter is to be supplied. *In the margin:* The omitted letter, followed by a slanting line.

Lines 16–17. Two separate paragraphs to be united in one. *In the type:* A curved line drawn from the end of the first paragraph to the beginning of the second. *In the margin:* "No ¶." The words "run in" are also, and frequently, used.

Line 17. Insert space between words. *In the type:* A caret, ∧, or slanting stroke, /, between the letters to be separated. *In the margin:* The sign #.

Line 19. The insertion of an em-dash. *In the type:* A caret, ∧, at the place where the omission is to be supplied. *In the margin:* An em-dash between slanting lines; thus, /—/.

The commencement of a fresh paragraph. *In the type:* The sign [, marked where the paragraph should begin, with the open side of the sign toward the trend of the type. *In the margin:* The sign ¶.

Line 20. The elision of a repeated word, called a "doublet." *In the type:* A stroke drawn through one of the words constituting the doublet. *In the margin:* The *dele*-mark, ⸎.

Lines 21–22. To take out a lead improperly inserted. *In the type:* A caret, >, between the lines, with the apex pointing away from the lines in question. *In the margin:* The *dele*-mark, ⸎, and the abbreviation "ld." (⸎ ld.).

Line 22. The insertion of an omitted clause. *In the type:* A caret, ∧, showing the point at which the words are to be supplied. *In the margin:* The omitted clause, from which is drawn a line to the caret in the type.

When the omitted passage is so long that to rewrite it in the margin would be a waste of time, the printer is referred to the original manuscript. In such case a caret is placed in the type and the words "out, see copy, page—" (giving the folio of the copy), or "out, s.c.," are written in the margin. In the manuscript the omitted words should be inclosed in brackets, preferably with a colored pencil, and "out" written at the place of omission.

Lines 22–23. Straightening crooked lines of type. *In the type:* The depressed words or letters inclosed by parallel lines. *In the margin:* Short parallel lines, with their ends pointing toward the type, ⁼⁼⁼.

Line 23. The elision of a hyphen between words and the closing up of the improperly compounded word. *In the type:* A slanting line drawn through the hyphen, with the sign ⁀, close up, above and below. *In the margin:* The double mark ⁒.

Line 24. The changing of lower-case to small capitals. *In the type:* Two lines under the words to be changed. *In the margin:* The abbreviation "s. caps.," or "sm. caps." See also line 14.

Line 25. The capitalization of a letter. *In the type:* A slanting line through the letter. *In the margin:* The capital letter desired, with three lines drawn under it and followed by a slanting line; thus, ⫽.

The substitution of one letter for another. *In the type:* A stroke through the letter. *In the margin:* The letter

which is to be substituted for that in the type, followed by a slanting line. (The slanting line serves both to attract the printer's eye and to separate one letter or word from another, in case two or more corrections are made in the same line of type.)

Line 26. The uniting of improperly separated parts of a word. *In the type:* Horizontal curves, ⁀, inclosing the separated parts. *In the margin:* Horizontal curves, ⁀.

The restoration of a word which has been stricken out. *In the type:* A line of dots under the word. *In the margin:* The Latin word *stet* ("let it stand").

Line 27. The insertion of quotation-marks, or inverted commas. *In the type:* A caret, ∧, at the point where the quotation-marks, or inverted commas, are to be inserted. *In the margin:* Quotation-marks, or inverted commas, in an inverted caret, ⋎. (The inverted caret serves to distinguish the apostrophe from the comma. Sometimes an inverted caret is used in the type as well as in the margin.)

Line 29. A dirty or "filled" letter. *In the type:* A stroke under the defective letter. *In the margin:* A small cross, x.

Line 30. The insertion of three spaced periods at the end of line 30, instead of the line of asterisks in line 31, to mark an intentional hiatus, or omission. *In the type:* A line through the asterisks. *In the margin:* Line 30, three spaced periods in a ring; line 31, the *dele*-mark, ∂. This alteration is one made for style and neatness.

Line 32. The substitution of an exclamation-mark for a comma. *In the type:* A slanting stroke through the comma. *In the margin:* An exclamation-point in an inverted caret; thus, ⋎.

Line 33. The insertion of apostrophes at end of quotation; thus, ⋎. See line 27, *ante.*

The page, when marked, is returned to the printer, who proceeds to make all necessary corrections. No. 2 shows the proof when corrected and clean. The compositor is usually paid by time for making corrections, and a serious item of expense will be incurred by numerous or unnecessary alterations. In some offices a ring or loop is drawn round the marginal mark of an error which is not the fault of a compositor.

A few general suggestions are necessary.

The question of the divisions of words into syllables should be settled by reference to a dictionary. As a rule, not more than three syllabic divisions are allowed in consecutive lines, unless, in very narrow columns, more are absolutely inevitable.

In cases of doubt, strike out the matter to be corrected and rewrite it in the margin exactly as it should appear in the type.

The logotypes fi, ffi, are used instead of the separate letters fi, ffi. When æ is desired in place of ae, it is indicated by a horizontal line or curve above the two letters.

The following errors are somewhat difficult of detection: 1. Changes of font, when the types of the two fonts are much alike; 2. Inversion of s and x; 3. The occurrence of inverted n, u, b, and p, for u, n, q and d, respectively.

Differences in fonts can be learned only by experience. The principal differences are in the shape of the letters, the thickness or blackness of the lines, and the size of the face.

Inverted s and x may be detected by the fact that the lower part of these letters is slightly larger than the upper part.

The main differences between n and inverted u, b and inverted q, d and inverted p, lie in the small projections called serifs which start at right angles from the sides or stems of these letters. For example, in n the serifs, or projections, at the bottom of the letter are seen on both sides of the prongs or "legs." In u the projections are seen on but one side. The differences in the other pairs of letters will be readily detected upon examination.

Other inversions for which it is well to be watchful are those of the letter o, the cipher, the period, the comma and the colon.

The spacing of the punctuation requires some care: Notice that the comma follows immediately the preceding word, but is separated by a slight space from the word that follows; that the semicolon and colon stand a little way off from the preceding word; that the period is followed by a considerably greater space than the other points.

Type is set either "solid," that is, without spacing between the lines, or "leaded," that is, with the lines separated by thin strips of type-metal, known as "leads." When but one "lead" is used between each pair of lines, the type is said to be "single-leaded"; when two "leads" are used, the type is said to be "double-leaded." Errors in leading are of two kinds: 1. Omitting leads; and 2. Inserting them where they are not needed. See lines 7–8, 21–22, *ante.*

Words may be carried up or down, to the right or left, by means of brackets placed about the words and repeated in the margin. The significance of the brackets is as follows:] means "carry to the right"; [means "carry to the left"; ⌐ means "move up"; ⌙ means "move down."

Corrections are made in the margin nearest which they occur. If the corrections are numerous, it is well to draw lines from the marks in the type to those in the margin.

The bibliography of proof-reading is that of the art of printing, of which it forms a part. Mention may be made of A. N. Sherman's *Printers' Manual* (1834); MacKellar's *American Printer; The American Dictionary of Printing and Bookbinding;* William Blades's *Pentateuch of Printing;* Marshall T. Bigelow's masterly *Handbook of Punctuation* (1890); and John Wilson's exhaustive *Treatise on Punctuation* (1864).

PROPERTY. See PERSONAL ESTATE, Vol. XVIII, p. 677; and REAL ESTATE, Vol. XX, pp. 317–321.

PROPHYLLUM, a botanical term applied to those bracts in an inflorescence which are borne on the pedicels of individual flowers; also called *bracteoles.*

PROPIONIC ACID, one of the fatty series, having the formula C^2H^5COOH. It gets its name from the fact that it is the first or simplest of the acids of this series, which have the fatty feel characteristic of the higher acids of the same series. It is formed in the fermentation of malate and lactate of lime, and can also be prepared synthetically; perhaps it is best made by the oxidation of propyl alcohol. It is formed in some fruits, in pyroligneous acid, and in smut.

PROPOLIS. See BEE, Vol. III, p. 422.

PROPORTION. See ARITHMETIC, Vol. II, p. 469.

PROPYLITE. See GEOLOGY, Vol. X, p. 209.

PROSECUTOR, one who institutes or conducts a criminal prosecution against another. A private prosecutor is one who institutes a criminal proceeding, or prefers a charge of crime. A public prosecutor is an officer representing the public, and whose duty it is to conduct criminal prosecutions. These officers are variously denominated as attorney-general, state's attorney, prosecuting attorney, and the like. Any one familiar with the facts may prefer a criminal charge, and if done in good faith, and with reasonable and probable cause for making the charge, such person will not be held liable in damages, even if mistaken.

PROSIMIÆ. See LEMUR, Vol. XIV, p. 440.

PROSOBRANCHIA, one of the three orders of

gasteropod mollusks. Recent authors include in the order those gasteropods with the gills in front of the heart and with the auricle in front of the ventricle. The nerve-cords are crossed, hence the old name of the group, *Streptoneura*, meaning twisted nerves. The second order of gasteropods, as now classified, is the *Opisthobranchia*, which in the above-named characters is opposed to the *Prosobranchia*. The third order, *Pulmonata*, includes all the forms which have no gills, but breathe directly. This is an adaptation to a life more or less terrestrial. The group, *Euthyneura*, as used in this ENCYCLOPÆDIA, includes the last two orders, which have the nerves not crossed.

PROSODY is, to a great extent, an artificial growth. The writers of the classical period found the language of Italy with a strong tendency toward modernization. The final consonants were being dropped, and syllables slurred over, so that the spoken language was beginning to show considerable divergence from the written language. Cicero ridicules the rustic pronunciation of *cauneas* for *cave ne eas*, and Plautus more than once scans *căvēto* as a dissyllable. Side by side with this shortening, there exists an excessive number of long syllables in the older Latin, which made the verses written extremely heavy and monotonous,—a defect which is compensated, however, by the tendency to let the accent dominate the natural quantity, as in modern languages. Thus we get such words as *supĕllectilem*, *senĕctutem*, with long syllables shortened to suit the requirements of the line. The writers of the classical age saved the language from the process of phonetic decay which was setting in, at least as far as regards the language of literature, and fixed a standard for the quantity, which is, with a very few exceptions, rigorously adhered to. Thus the final *a* and *e* were in most cases used short, ablatives and some adverbs being the commonest of those which were left long. The other final vowels are almost always long. Of consonantal endings, *t*, one of the commonest, which was often long in the time of Ennius, as in the heavy line,

noenum rumores ponebat ante salutem,

is invariably used short; *s*, the other most frequent termination, is preceded by *a*, *e*, and *o*, with a long quantity, *is* and *us* being, as a rule, short, except dative and ablative cases in *is*, and some nominatives in *us*, where the vowel remains throughout the inflexions. On the other hand, two consecutive consonants always lengthen a vowel which precedes them except in certain combinations of *a* mute followed by a liquid. This is also the case in Greek, but there there is a greater elasticity in shortening the vowels.

The Romans were not naturally a people of poetical temperament, and borrowed their metres, as indeed they did everything connected with art, from the Greeks,—a fact which is illustrated by the curious epithet *doctus*, applied to poets. The oldest form of verse, however, the Saturnian, seems to be indigenous. It consists of a rising rhythm of three iambi, with a pause, and then a falling rhythm of three trochees; as,

dabunt malùm Metèlli | Naevio poetae.

We have the same metre in the old nursery rhyme:

The queen` was in` her par`lor | 'eating bre'ad and ho'ney.

The comic poets Plautus and Terence take their metres from the Greek stage, using them in such a way as to come as near as possible to the language of ordinary conversation, especially the trochaic tetrameter and the iambic senarius, which lend themselves particularly well to this. The first line of the *Aulularia* is a good example of a homely sentence which, by means of six elisions, contrives to scan as an iambic line:

Exi, inquam: age exi: exeundum hercle tibi est hinc foras.
(Get out, I tell you! out of the house at once, by Jove!)

The metre will be seen by reading the line thus:

Exìnqu | àgèx' | exeùnd | hercletìb | est hìnc | foràs.

The last foot only, in this style, must be a genuine iambus, and the short syllable in the second and fourth feet, which are necessary in the Greek iambic metre, are constantly dispensed with.

For long poems the hexameter was always taken both by Greek and Latin writers, owing to its dignified and sustained effect. The grand roll of the Homeric line has not been reproduced in Latin, and the metre has not been found to adapt itself to English words. Its development, however, in the hands of Virgil was very marked. Lucretius, no doubt, handled it far more freely than his predecessors, but considering the short interval between the two men —33 years between the dates of their deaths—the difference of sound and rhythm is remarkable. This is not to be accounted for by the subject-matter; for though Lucretius is writing on philosophy, he is imbued with the spirit of poetry, and wherever it is possible, his language is as picturesque as that of any poet, and the dignity and grace of his opening lines in more than one book make one wish that he had not felt constrained to deal with such a theme and to state it with such uncompromising clearness. The rhythm of Lucretius compared with Virgil might be described as *staccato* compared with *sostenuto* in musical phraseology. The reason of this is, that the older poet not only does not admit so much variety of rhythm, but makes the rhythm seem to end at the end of each line, even though the sentence may not stop there. Again, he is not so particular about keeping the *cæsura*, or definitely marked break in sound, in the middle of the line, and has no hesitation in ending with words of one or four syllables,—a thing which Virgil only does with a purpose. For example:

At quoniam supra docui nil posse creari
De nilo neque quod genitum est ad nil revocari,
Esse immortali primordia corpore debent,
Dissolui quo quaeque supremo tempore possint,
Materies ut subpeditet rebus reparandis.—*Lucr.* i, 543.

Here, in the second line, the accent does fall naturally on *nil*, but in the last, *rebús* has the accent thrown forward on to a naturally short vowel with bad effect, and the unbroken *subpeditet*, in the middle, divides the line into three pieces instead of two, making it sound like a piece of prose whose quantities accidentally convert it into a hexameter.

Turning now to Virgil, we come to one of the greatest masters of rhythmical style in any lan-

guage. He writes, not line by line, but sentence by sentence, hence there is an even flow of words from one verse to another, and monotony is avoided, not only by the artistic arrangement of words, but by the variety of the pauses. He marks the *cæsura* invariably, and hardly admits a quadrisyllable at the end; if he does so, it is usually a proper name, as "in Actæo Aracyntho." Monosyllables are used sparingly, and then with strong effect, as in the line describing the rise and breaking of a large wave,

Insequitur cumulo præruptus aquæ mons,

where the dactyls at the beginning show the water rising by leaps until the heavy sea crashes down upon the ill-fated ship with one tremendous syllable. Another similar termination, which, indeed, he has worked rather hard, is the *procumbit humi bos*. There is a very descriptive combination of swift dactylic rhythm and pause in *Æneid* ii, where the Trojans defending Priam's house loosen a turret and heave it over upon their assailants, which is worth quoting in full:

convellimus altis
Sedibus impulimusque; ea lapsa repente ruinam
Cum sonitu trahit et Danaum super agmina late
Incidit.—*Æn.* ii, 495.

The sharp pause at *impulimusque* marks the moment while the masonry hangs tottering; then follows a line and a half of short syllables as it falls with seemingly increased rapidity, closing abruptly on a short syllable, as though broken into pieces. Equally effective, too, are his slow-moving spondaic lines, as, at the descent into Inferno

Ibant obscuri sola sub nocte per umbram.
—*Æn.* vi, 268.

and the dignity of a long word following a trochee at the beginning of a verse; as,

Quique sacerdotes casti . . .

or

Jura magistratusque legunt . . .

The elegiac couplet consists of a hexameter and the so-called pentameter, which is the first half of the hexameter line repeated twice, with dactyls only in the latter half. Longfellow has used it with success as a choric metre in his *Masque of Pandora*, but adding rhyme:

These are the Voices Three, That speak of endless endeavor;
Speak of endurance and strength, Triumph and fullness of fame:
Sounding about the world, An inspiration forever,
Stirring the hearts of men, Shaping their end and their aim.

It is seldom that the sentence continues from one couplet into another, and, as a general rule, each line is complete in itself. Ovid is the great master of this style, and by a comparison of him with Catullus before him and Martial after him, as well as with Greek models, we find that he allows himself much less latitude in the pentameter. His restrictions are, rarely to allow elision, especially in the second part; not to admit words of one or three syllables at the conclusion of it; and of dissyllables, to make use only of verbs, substantives and the possessive adjectives. Very occasionally he ends with a quadrisyllable, but in twelve succeeding couplets of Catullus's *Coma Berenices* only one pentameter ends in a two-syllable word; the others are *temporibus*, *obitus*, *pollicita es*, and the like.

Of the metres used in epigrammatic writing besides the elegiac couplet, the most noteworthy are the hendecasyllabic and the schazon, or limping iambic. The former consists of five feet, of which the first is a spondee, or sometimes an iambus, the second a dactyl, the third and fourth trochees, and the last a spondee.

Quæris | quot mihi | basi | ati | ones
Tuæ | Lesbia | sint sa | tis su | perque.

There is no *cæsura* in the line at all, and, as in all other verse, the quantity of the last syllable is of no account. The iambic schazon contains six feet, and is, in all respects, the same as the ordinary iambic of the Greek drama, except that the last foot is a spondee, which, by bringing two accented syllables together, produces the curious halting effect which gives the verse its name. The following line of Catullus will serve as an example:

O fúnde nóster, séu Sabíne séu Tíburs.

The most frequent in use of lyric meters are the Sapphic and Alcaic stanzas and various combinations of choriambi (–⏑⏑–), with a spondee at the beginning and an iambus at the end.

The Sapphic consists of three lines of five feet, of which the third is a dactyl, the second a spondee in Horace, but sometimes a trochee in Catullus, as also in the Greek of Sappho, and the rest trochees. Added to these is a short line of a dactyl and spondee. The Roman poets are more strict about *cæsura* than the Lesbian poetess, and the omission of it gives a very different rhythm. Horace, in most cases, puts it after the fifth syllable, but both he and Catullus occasionally use it after the sixth. The variety thus produced will be seen by comparing the first two lines of *Hor.* i, 10:

Mercu | ri, fa | cunde ‖ ne | pos At | lantis
Qui fe | ros cul | tus ‖ homi | num re | centum.

The Alcaic stanza consists of four lines; the first two are alike, of eleven syllables, with *cæsura* after the fifth. The rhythm rises in the first half with a spondee, an iambus and a syllable over, and falls in the second half with a dactyl, a trochee and a syllable over. The third line begins with a monosyllabic base, sometimes called *anacrusis* (backing water), and contains a trochee and spondee twice repeated. The third line has two dactyls, followed by two trochees. These last two lines have no *cæsura*, but Horace is very fond of beginning and ending the third line with a trisyllable.

Cur mē | quĕrē | lis ‖ exăni | mas tuis?
Nec dis | ămi | cum est ‖ nec mihi | te prius
O | birĕ | Maece | nas, mĕ | arum,
Grandĕ dĕ | cus cŏlŭ | menque | rerum.

Horace seems to have made up this stanza from Greek lyrics written in a mixed Lydian and Dorian rhythm. The first lines, with the two accented syllables in juxtaposition, are Lydian, while the Dorian predominates in the latter; indeed, if the *que* in the last line were omitted, the rhythm would be entirely Dorian,—i.e., running on like a military march.

There are some sixteen different combinations of metre used by Horace, besides his hexameters (which are, according to his own showing, only prose arranged in feet), and of these nine only occur once. The Epodes, his real satires, are mainly in iambic lines of 6 and 4 feet, alternately. An instance of a metre nowhere else used in Latin is *Od.* i. 18, where the feet are *Ionic a minore* (⏑⏑– –), and the measure continues for forty such feet without any break. The Attys of Catullus is another unique poem, from a metrical point of view. It is called galliambic, from the Gaulish priests of Cybele, who are the subject of it, and from the iambic character of the verse. It reads somewhat irregularly, but with a wonderful vigor. The normal line consists of an anapæst, two iambi and a long syllable, after which the *cæsura* comes,—so far it resembles the Anacreontic line,—then another anapæst, one resolved anapæst of four short syllables, and another syllable over, giving the lines what is called a catalectic rhythm.

Ĕgŏ vĭ | tam ăgām | sŭb ā | lĭs ‖ Phrygiæ | cŏlŭmĭnĭ | bus
Ŭbi cer | vă sĭl | vĭ-cŭl | trix | ŭbi ăper | nĕmŏrĕ văgūs?

E. W. Huntingford.

PROTAGON. See Chemistry, Vol. V, p. 503.

PROTANDRY, a botanical term applied to those cases in which the anthers of a flower mature, as shown by shedding pollen, before the stigma is mature, that is, has become receptive. In such a case, the pollen, to be effective, must be transported to the stigma of some older flower, the agent of transfer being usually an insect. See Pollination, in these Supplements.

PROTECTION, a method of governmental economic intervention that turns traffic and capital into channels through which they would not flow if left to themselves. The object of this intervention is to induce citizens of the nation practicing it, to put money and energy into home productions rather than to purchase abroad the commodities it desires to consume, provided they can be made at home. There are many forms of protection followed by different nations. Those most common to civilized countries are copyright and patent laws, which are enacted for the encouragement of literature and invention by creating a monopoly of the articles thus safeguarded for a fixed period. Subsidies are a form of direct protection, of which familiar examples are the bounties paid by European continental states for the production of sugar, or as were provided for Louisiana planters of the cane, under the McKinley tariff. Subsidies are not uncommon for the promotion of steam navigation. Great Britain aids in the building of mercantile steamships under specifications from the admiralty, with provisions that in time of war such vessels may be purchased by the government for transports or for reconstruction as cruisers. Again, long contracts are made for carrying the mails by vessels sailing under the flag of a particular country and at rates much greater than would prevail in the competitions of the open market for the same service.

But the usual conception of protection is, that it consists in customs-duties so laid as to lessen the competition between home and foreign products. It is in this sense that France, Germany, Italy, the United States, Canada and most commercial countries are said to pursue a protective policy. Now most trading nations rely upon customs-duties for a very considerable part of their revenues. The United Kingdom derives nearly one fourth of its income, exclusive of its postal and telegraph service, from tariff duties. Belgium, which is a thoroughly free-trade state, relies upon these imports for about one fourteenth of its income. France, which is an example of a protective state, obtains one seventh of its income from customs. In the United States of America there has grown up a practice of leaving all sources of direct taxation, except imposts on liquors and tobacco, to the several states, and the general government, by the constitution, has control of all duties upon foreign traffic. Until the Civil War, for many years that government sought no other source of income, and even now a direct tax assessed by such authority meets with aversion from taxpayers. Thus, they were able to overthrow the income tax of 1894 in the supreme court on the ground of its unconstitutionality, the opinion of the court being in such terms as practically to deprive Congress of the power to levy a direct tax on real estate or personal property. (See Income Tax, in these Supplements.)

Clearly, therefore, the government is driven to rely for a revenue upon its tariff schedule and its internal tax on spirits and tobacco. In times of active foreign trade the first source of income provides the government with about 60 per cent of its income. In the year of financial depression, 1894, this source of income fell to 44 per cent, but for the five years ending with 1895, it provided almost exactly half of the total revenues of the government.

Still, it will not be fair to say that this peculiar position of the government forces it to a protective line of policy. The difference between protection and free trade depends on the incidence of the tax. The free trader would put the impost of customs on as few foreign products as possible, and then on those that cannot be raised at home and are in the nature of luxuries. Thus, the United Kingdom levies its impost duties on tobacco, tea and alcoholic products, the two latter producing roundly as much as tobacco, and that is an annual average of about fifty million dollars. The advocate of free trade will not tax food supplies, nor the raw or unfinished material of manufacture, and he exposes all home industries to foreign competition, on the ground that each people should perform for the world that service which they can do best, that is, most economically. He also claims that a duty thus levied falls only upon the consumer of the taxed product; that it can be simply and readily calculated in its effect upon the budget, since the amount of the commodity which will be consumed inside the customs line is known, whereas a protective duty, by raising the price of any line of merchandise, puts an incalculable sum into the hands of private dealers, while the government gets but the small moiety paid on actual importations.

On the other hand, the protectionist distinctly

wishes the tariff duty to fall upon foreign goods which come into competition with products which either are or can be supplied by home industry. He would have the incidence of the tax upon raw material as well as upon merchandise in any stage of manufacture. He would put it upon wool to protect the farmer, and correspondingly upon worsteds and woolen fabrics to protect the manufacturer; upon potatoes for the sake of the truck-gardener and upon starch for the factory-owner's profit. He prefers the impost to fall upon competitive commodities, though he would, for the sake of revenue, allow it to fall upon the tea, coffee, tobacco or sugar which might be brought into a land not semi-tropical or tropical.

Another distinction between the two systems is that the free-trader prefers an *ad valorem* impost, and the protectionist advocates a specific duty, or both. An *ad valorem* duty falls in amount as the prices of the commodity on which it is laid go down. Just when the home producer has the hardest time to keep his enterprise afloat, that is, when prices are lowest, he is least protected by an *ad valorem* duty. But a specific duty is of lessening ratio as prices advance. Moreover, it takes away from the importer the temptation to resort to fraudulent invoices. No matter what a commodity is billed at, the specific duty remains the same.

Again, the protectionist knows that the tenor of his principles is to lessen importations, and therefore, to reduce the revenues of the government. Extreme men go so far as to say a true protective duty should be prohibitory; that as soon as the tariff duty is sufficiently high to keep out of the home market foreign competitive goods, it makes no difference how much greater it is made. If a 25-per-cent duty would keep out Sheffield steel or Manchester muslins from New York, a 500-per-cent duty would do neither more nor less. If asked how the prices of any home-made commodity are to be kept down to a reasonably remunerative profit to the producer, he will answer that home competition must bring prices to that level. So long as the manufacture or production of a line of goods is exorbitantly lucrative, capital will flow in that direction until the investment has sunk to a reasonable profit, and then the temptation to invest will cease. But these views are extreme, and in actual practice have few advocates.

There have been various methods employed to determine what customs-rates are expedient. In the United States those who are called "free-traders," and whose views approach as near that ideal as the fiscal system of the government will permit, express their position as in favor of a "tariff for revenue only." Others demand an adjustment that shall be for "revenue with incidental protection";—that is, they prefer that a reasonable tax shall fall upon competitive foreign goods. With them a reasonable duty is one that will tempt to investment, but shall stop at a point where the importer can meet very lucrative profits with his taxed competition. Still others, a few, as has been already intimated, wish to stop wholly the importation of what can be produced at home. Within these limits there is a variety of views, but any protective scheme must be in its nature tentative, and rest upon expediency. It is not susceptible of theoretical treatment.

Various suggestions have been made for the appointment of a commission on tariff duties which should study questions of labor, competition and profits, and report to Congress from time to time schedules of duties that are, in its judgment, necessary for the encouragement of home industries. But the proposal has met with little favor, because political leaders have been unwilling to let so agitating and potent a means of arousing the passion of self-interest escape from their control.

No commercial country of the world has suffered more from attacks on its fiscal system and from violent changes in it than the United States. In colonial times the people had no control whatever over their foreign trade. They were restricted by navigation laws of an arbitrary sort and by vexatious duties, for at that time Parliament had no mind to allow the American colonists even to supply their own wants, much less to enjoy trade with the West Indies and European states. The Revolutionary War had the effect of a protective system for two reasons: first, hostilities put an end to British trade to a large extent; secondly, the money of the colonies was so depreciated that imported goods could not be paid for, except at heavy premiums for exchange. A like condition of things arose in the war of 1812–15, and again at the opening of the Civil War. The necessity for new taxes, the risks and insurances attending importation, deranged exchange with gold at a premium, combined to start innumerable industries for which the government itself made a vast market. Out of the recollection of these circumstances has arisen a small school of protectionists who favor a depreciated currency, as the free coinage of silver, because it would lead to invoices adjusted to the inferior money, and consequently to *ad valorem* duties proportionately enhanced.

Aside from these immediate war effects, which invariably gave the country new industrial impulses, under its constitution the United States changed its tariff system eleven times in 107 years, in which there were some 32 years of "tariff for revenue," and the rest under the protective system, unless the Wilson law of 1894, which, except in a few partisan particulars, corresponds very fairly to the tariff of 1883, be considered in the former class. The longest period under one policy is that from the Civil War to the election of Mr. McKinley to the Presidency, a period of 35 years, during which the wealth of the country increased in a ratio unexampled in statistical history. If this period ended in depression and silent mills, there was reason enough for it from changes in the currency, made or threatened, and from the alteration of the tariff in 1894. In respect to alterations of the tariff, a change to higher protection has this advantage: it causes rising markets, while every recession from protection makes declining prices. The suspense attending such an impending change, the uncertainty that long debate throws over business engagements, quite adequately accounts for business anxiety and depression, without recurring to the effects of a customs-law not

long enough in operation to exhibit permanent effects.

A protective adjustment of duties is far from being a simple scheme, even when it is very desirable. The question arises at once as to how far protection should be granted. If a country be new, without industrial plants, and without skilled labor, it is well-nigh impossible for it to compete with old countries having large investments in factories, wide business correspondence, high credit and low rates of interest, abundant means of communication, and control of extensive and remunerative markets. These are the advantages that accrue from priority in the field. Here is a condition of things that brought from John Stuart Mill his concessions in favor of protection. His language is: "It cannot be expected that individuals should at their own risk, or rather to their certain loss, introduce a new manufacture and bear the burthen of carrying it on, until the producers have been educated up to the level of those with whom the processes have become traditional. A protecting duty, continued for a reasonable time, will sometimes be the least inconvenient mode in which a country can tax itself for the support of such an experiment."

Before there can be any production worthy of taking into consideration, there must be a producing plant. Even for the farmer, his land, his tools, his barns, his fertilizers and his season's labors involve an investment necessarily prior to a harvest. They are to him what a mill is to the flour-manufacturer, or the factory to the weaver. As industrial life grows more complex, manufactures require a large aggregation of capital. The money invested in such enterprises is wasted for all purposes except those of specific production. A new invention, or the improvement of an old one, has often put a farmer, as well as a manufacturer, out of the competitive race, and turned a once valuable property to waste. So a change in methods of transportation, in rates of freight, or even in fashion, will make a particular industry unremunerative. The life of even the best and most modern machinery, too, is short. The waste of capital in establishing and maintaining an industrial plant is something enormous. Time is also necessary, after it is shown that a commodity can be produced cheaply enough to warrant investment, to find a market. Confronting these hard conditions, the pioneer manufacturer of a country may well be apprehensive if he finds that large concerns abroad, with unlimited credit, are bent on his ruin, even at their own temporary loss. Thus John Brougham, at the close of the war of 1812–15, when new industries were nascent in the United States, advised his constituents to glut the American market with goods sold at a loss, in order "to stifle in their cradle these rising manufactures." Under the tariff of 1846 this happened again, and American iron-furnaces went out of blast and rolling-mills were closed because imported English iron was sold at $40 a ton, when the American protected production had been at $60. The industry in the United States was crushed and the old plants were never operated again. Then imported iron rose to $80 a ton.

Another scheme for finding a basis for protective duties is to determine the rate necessary to maintain the superiority of wages in one country over that of another. But this is a complicated method, for, as Professor Richard T. Ely has shown, low wages do not go with cheap production. The better paid workmen have more enterprise, more dexterous adaptations, more invention, and so they demonstrate in the competitive markets of the world that they are worth their wages. Thus Thomas Brassey, when engaged on his French contracts for railway construction, took with him a band of English navvies to whom he paid one dollar a day, while to his French workmen he gave but half that sum, and he thought this well worth his while. In due time his Frenchmen clamored to be put on the same basis of pay as the navvies, and their demand was conceded. The result was economically favorable, for with advanced wages the Frenchmen did correspondingly more and better work. Again, Mr. E. Dubied, a Swiss manufacturer who had visited the Centennial Exposition in Philadelphia (1876), and had investigated the industries of the United States, advised his countrymen: "At this rate there is no reason why all our industries should not be overwhelmed, one after another, by those of America; and yet, when we ask what wages are paid the workmen in the latter country, we learn with surprise that they are three times as much as our workmen, both artisans and farm hands, receive." This result he attributed to the greater variety and excellence of American machinery.

Three causes, however, operate to break down the superiority of highly-paid skilled work. The most important of these is the ever-increasing subdivision of labor, by which the demand for skilled artisans is lessened. Fewer of them are needed in a great modern factory or machine-shop, where the duty of each operative is reduced to a single function. This brings on monotony of toil that is destructive of personal enterprise and ambition in the workman. Another cause is the production of commodities such as Charles Kingsley called "cheap and nasty." In sharp international competition, cheap men produce deteriorated fabrics and adulterated goods, and the market is flooded with them, to the exclusion of better wares from general use. (See ADULTERATION, Vol. I, pp. 152–160.) Thirdly, immigration has had much to do with depressing labor in the United States. In this respect labor, like capital, tends to seek the most remunerative places and functions until its condition is equalized over competing nations. There is but little doubt but that the superior state of the American workman has acted upon the imagination of European wage-earners, drawing them to Western shores and raising the standard of living abroad. But this has been accompanied by a decline in the circumstances of the American wage-earner. It is evident that under free-competition the tendency of labor conditions of the great commercial nations is toward an equality of standards of life. To arrest this process the United States have forbidden the importation of Chinese coolies and the immigration of contract labor and paupers from Europe; and this

is as surely part of a protective system as imposts on foreign commodities produced by cheap labor. There are few things upon which there is greater unanimity of sentiment in the United States than the determination to maintain the superiority of its workmen, both in the difference of their wages from those of Europe and in their degree of comfort. The protectionist asserts that this is most efficiently done by making tariff-rates correspond with the difference of wages.

It has been widely supposed that the agricultural interest receives the least benefit from a protective system, if it does not suffer distinct detriment. To this, answer is made as follows: Under free-trade Great Britain has sacrificed her farming to her manufacturing and trading predilections. In no civilized country is agriculture more depressed or does land go out more from under the plow than in the United Kingdom. Even her pasture area shrinks. Again, the farmer is deeply interested in having an ample market as near his barns as possible. This is to be obtained by diversifying the industries of the country and making them as large as practicable. The more men there are in the shops and factories of the land, the greater will be the demands for the fruits of husbandry. There is a balance to be maintained between the enterprises of a nation. A large sheep-raiser of New Mexico argued that a duty of 7½ per cent on imported wools would soon result in having 100,000,000 sheep in the herds of America. Each sheep requires 5 bushels of corn a year for its maintenance. This industry, therefore, when raised to the condition described, would make a home market for 500,000,000 bushels of corn, or for more than the entire surplus of the country. It is no advantage to the farmer to send his breadstuffs and provisions across the continent and the sea to compete in Liverpool with the wheat of Odessa and India. The transportation charges will be borne by his products. It is far better that the factory town should be near him to consume his surplus. If men are driven from the shops and mills they must go upon the land for a livelihood. This would increase the surplus of agriculture and lower its market price, making farming still less profitable. With this decline would come a lower grade of husbandry and the drift would be toward more hopeless and shiftless deterioration. To no class of the community is the home market more desirable than to the farmer, and it is protection that must create and maintain that market.

It was one of Henry C. Carey's arguments for the home market, that the exportation of farm products was constantly taking fertilizing material from the soil, where it is needed, away to foreign cities where it is not needed, and becomes a nuisance for the pollution of water-courses. This fertilizing material can only be replaced at considerable cost by the transportation of phosphates, nitrates and guano from the isles of the seas or the deserts of Peru. Human ingenuity has not been able to create, but only to discover, potash salts and phosphates. When once taken from the land they must be replaced or the ground will grow sterile. Is it not better for the wealth of a country and the profit of the farmer, that this exploitation of the fertility of land should cease—that his products should be consumed near his fields, so that he can again return to the soil speedily the manures he has taken from it? Is it sound policy to impoverish one land that another may devote itself to manufacture?

Much is said of the injury to the consumer through the artificial rise of prices caused by a protective tariff. But the consumer is also a producer, and it is what he earns in that capacity that enables him to be a consumer at all. It were folly to offer him cheap bread, shelter and clothing, if he is deprived of the means to pay the pittance asked for them. In truth, the most prosperous times of a country are when wages are high and prices good.

Finally, the industrial independence of a country is necessary to its self-defense. A nation can feed its armies from its farm products, but it cannot equip or transport them so. Only countries having diverse and well-established manufactures can maintain a modern navy. It takes a farmer a whole year to turn his capital once, from harvest to harvest; the manufacturer's capital is going and returning incessantly. Hence a manufacturing country will bear a heavier rate of taxation and can meet an emergency more readily than an agricultural one. The nation that is sufficiently developed to supply all its own needs is in a posture to command peace or to repel hostilities as soon as they arise. If it be a protective policy that gives to it industrial independence, then it is a dictate of self-preservation to pursue protection. See FREE-TRADE, Vol. IX, pp. 761–770; and TARIFFS, in these Supplements.

D. O. KELLOGG.

PROTEIDS. See CHEMISTRY, Vol. V, pp. 502, 503.

PROTEROGLYPHA, a suborder of serpents, including those with poison-fangs always erected. The group is opposed to *Solenoglypha* (q.v., in these Supplements). The cobra-de-capello (*Naja*), the sea-snakes (*Hydrophidæ*) and their relatives constitute the group. Some of the most venomous of reptiles are included.

PROTEST. See BILL, Vol. III, p. 582.

PROTESTANT EPISCOPAL CHURCH, IN THE UNITED STATES OF AMERICA, the legal title of that offshoot of the Church of England that was organized in the United States after the achievement of their independence. The expression *Protestant Episcopal* came into vogue in Maryland during the Revolutionary War. At that time the title *Church of England*, which this religious body had borne during colonial times, if it had not become a misnomer, was prejudicial in the minds of a nation striving to throw off the British yoke. The name that came into use indicates that this church is protestant toward the Church of Rome, and episcopal among Protestants. In 1789 a general convention of all the dioceses fixed this title, and it has remained unchanged, notwithstanding repeated proposals by Ritualists and High Churchmen to take a name of vaster comprehension.

COLONIAL PERIOD. The first charter of Virginia (1606) established the Church of England in that province, and in Newport's company came Rev.

Robert Hunt, who first preached in the United States at Jamestown, 21st of June, 1607, under an awning of canvas. He built a tiny church there, and served in it until his early death. In 1619 Governor Yardley organized the first legislative assembly of Virginia, and it declared the Church of England to be the church of Virginia and made provision for annual stipends to be paid for the support of four clergymen. In 1634 jurisdiction over the whole Anglican Church in the colonies was conferred on the bishop of London, and this was the disciplinary organization of the colonial church for 150 years. During all that time no prelate of that title put foot on American soil, nor was provision made for the creation of a colonial episcopate. The bishop of London ruled by commissaries sent to America, of whom James Blair was the most conspicuous. He was commissary from 1689 to 1743, and had jurisdiction over Maryland and Virginia. Under such a system ordained ministers were only to be obtained either by their importation from Great Britain, or by sending devout men to England for orders at the cost of a long voyage out and back and a considerable sum of money. There was no machinery of ecclesiastical discipline in the colonial church, and this state of things led to important consequences of a dogmatic sort many years afterward.

In New England the development was on quite other lines. The Plymouth Pilgrims were separatists, and did not build the institutions of Massachusetts. They were influential only by the large toleration and sweetness of their example. The Puritans of Massachusetts Bay Colony were men of another mold. At the time of the Endicott settlement in Salem, in 1628, the Puritans of England were not contending for liberty of worship, but for the reformation of the Church of England after the pattern of the church in Geneva. They wished to adhere to the establishment, but to eliminate from it prelacy and vain ceremonies. In America they considered themselves members of the mother-church, only their pattern of it was a purified one. Hence the Endicott immigrants, finding among them two brothers who were sticklers for the use of the *Book of Common Prayer*, sent them home in the ship that brought them, because they promoted sedition. So strong was the hostility to prelacy that the first Episcopal church proceeding from voluntary selection in Boston was not founded until 1723, and then this event came about through an influence originating in Connecticut. However, under the arbitrary command of Sir Edmund Andros, the *Prayer-Book* was forced upon the Old South Meeting-House in 1686, and three years later King's Chapel was built with English contributions, and remained an Episcopal congregation until James Freeman, in 1787, succeeded in carrying it over to the Unitarians.

In 1707 an Anglican parish gained footing in Stratford, Connecticut, and in 1722 Timothy Cutler, rector of Yale College, joined it at the cost of his connection with the college. He then went with Samuel Johnson and two others to England to obtain priest's orders. He and Johnson returned the next year—Cutler, to become rector and founder of Christ Church, Boston; and the latter, to become, in 1754, the first president of King's (Columbia) College, in New York.

In 1696 Trinity Church was built in New York, and Mr. Vesey, who went to London for orders, was for fifty years its first rector. The endowment given to it by Queen Anne, and its farm extending from the church along the Hudson River to Christopher Street, in old Greenwich, have made it the richest single religious corporation in the United States. This parish was organized under an act of the previous year for the maintenance of Episcopal priests, and in the same year Christ Church, Philadelphia, was founded, the first parish of this denomination in Pennsylvania.

In the Carolinas the famous constitution drawn up by John Locke provided for the establishment there of the English Church, though the philosopher did not approve of the clause having that purport, for these colonies were full of dissenters. Thirty-five years later, in 1704, the churchmen of South Carolina obtained a bare majority in the provincial assembly and proceeded to disfranchise dissenters and to order the maintenance of Episcopal churches out of the public revenue—an example followed by North Carolina the next year.

The colonial church had its greatest support in the Society for the Propagation of the Gospel in Foreign Parts, organized in 1701, in London, at the solicitation of Commissaries Blair and Bray. Perhaps its best service was that of putting into the hands of the Bishop of London the means of disciplining the dissolute of his American clergy, for if he could not bring them to ecclesiastical trial he could cut off any support drawn from the society. The influence of this propaganda was seen in the increased number of ordained men sent to the colonies and their greater respectability for learning and character.

At the opening of the Revolutionary War a peculiar church polity had become firmly established. It was that of lay control of temporalities in the colonies. Thus it was not in the power of any spiritual authority to force a minister upon an unwilling parish. So, too, when later on the church came to organize on an independent basis, the laity were recognized as a fundamental factor in government. The causes of this in the South lay in establishing the church. When glebes were granted by law in 1619 to four parishes in Virginia, the administration of the property was put in the hands of vestries. Moneys paid out of taxes were intrusted to vestries in Virginia and the Carolinas. When Trinity Church was organized in New York the arrogant governor, Fletcher, demanded of the legislature the right to appoint or remove its minister, but the legislature denied it to him and gave the right of presentation to the vestry and wardens, and even authorized Episcopal parishes to settle rectors over them who were not in Episcopal orders. In 1748 the legislature of Virginia settled a long series of litigations on the part of clergymen to recover tithes and stipends by finally conferring on vestries the patronage of their respective livings, and it was this act which put an end to promising negotiations of the Bishop of London with the government to

give America an episcopate. The government declined because these vestries intercepted the prerogatives of the crown. Now these colonial vestries were the rate-payers of the parish, as was then the custom of England. Subsequently to the Revolution, in most dioceses the corporate body was made to consist of the wardens and vestry; in some the rector is added, so that without him the vestry cannot transact business when the living has such an incumbent. In some dioceses the rector has no seat with the vestry at all. In others, business may be done in his absence. In no diocese is the rector a corporation sole with a life interest in the temporalities, as is the case in England. This recognition of the lay element is a great departure from the practice of the mother-church, in her convocations.

At the close of the Revolutionary War there were about eighty parochial clergymen in the United States, those not at the head of the few strong city parishes being the missionaries of the Society for the Propagation of the Gospel. From them the society withdrew its stipends. There were also a considerable number of ordained men, who, in those unsettled times, had fallen into evil ways, and had ceased to officiate, and there was no one to call them to account. During the war many Episcopal ministers retired or fled from the country. Suspicion of their patriotism attached to them, because taking orders in England involved subscriptions of loyalty to the church of that country at a time when non-conformists were being proscribed by law and the court was jealous of its prerogative. To most colonists an Episcopal minister represented a foreign church. The disputes of the Colonies with Parliament and the Crown enhanced this distrust, although some of the most conspicuous of the parochial clergy were outspoken patriots. As a consequence of these things, when the war-clouds rolled away, this church was depressed with poverty, unpopularity and disorder.

Obtaining the Episcopate. There are some local traditions that John Talbot, of Burlington, New Jersey, and a Mr. Walton, of Philadelphia, obtained consecration of the nonjuring Scotch bishops early in the eighteenth century, but sound church historians do not give the tradition credit. If it were true, the men are not known to have exercised episcopal functions.

In 1783 ten clergymen of Connecticut met secretly at Woodbury and agreed to send one of their number to England to ask for the episcopate there, but with instructions to seek it in Scotland if denied in London. They chose Samuel Seabury, who had been a chaplain to a Tory regiment in New York and was for the rest of his life on the retired pay-roll of the British army. The statutory requirement that a man must take the oath of royal supremacy as a prerequisite to consecration in England barred his way to the English succession, and he turned northward. On Nov. 14, 1784, he received consecration from the Scotch bishops in the house of Bishop Skinner of Aberdeen. He returned and settled in New London, exercising his functions in Connecticut and Rhode Island. He participated in one consecration, that of Clagett of Maryland, and there were then present the three bishops in the English line; yet he had a very marked influence on the development of the Protestant Episcopal Church. Stiff Anglicanism prevailed in Connecticut; the Middle and Southern clergymen were latitudinarian or evangelical.

At a gathering of a few clergymen in New Brunswick in 1784, plans were formed for the meeting of a convention in Philadelphia the next year. One of the first considerations was to settle upon the constituency to be represented there. There was a considerable number of men in orders whose habits were, at least, not to edification, and their number was likely to be increased by the arrival of others desirous of escaping the ordinary at home. Lists were made of the clergymen of character to be recognized outside of Seabury's diocese, and they were invited to attend, as well as a number of eminent laymen. The convention of 1785 represented seven Southern and Middle states, the presence of the laity then being a novel feature, and one not acceptable to Connecticut. One of the first steps taken was to organize standing committees for each state, to act as ecclesiastical authorities until bishops should be obtained. These committees were to make up clerical lists, certify to each clergyman his right to be recognized as a minister of this church, and all others who lacked this certificate were prohibited from officiating in any congregation of the church under penalty of being advertised as impostors. Thus arose a new feature of polity, the "standing committees" common to every diocese from that day. They comprise usually four laymen and four clergymen; are a council of advice to the bishop and the administrators of the diocese when the bishop is away or the office is vacant. They certify the testimonials of all candidates for ordination, and in the recesses of the general convention must confirm or reject every nominee for a diocesan episcopate before he can be consecrated. They also present a clergyman for trial.

The convention which instituted this unusual and excellent system also drew up a constitution establishing a general convention to meet triennially, and to be composed of equal numbers of clerical and lay delegates from each diocese, and of a house of bishops when the church should possess three prelates. The two houses were to concur in legislation, and the lay delegates had a veto on the clerical vote when votes were taken by orders. The convention also put forth the *Proposed Book of Common Prayer*, which, under the influence of the peace-loving, latitudinarian White, was in substance the English book relaxed in dogma favorably to dissenters and adjusted to new political conditions.

In 1787, Parliament having authorized it, William White and Samuel Provoost were consecrated on Feb. 4th, in Lambeth Chapel—the one, bishop for Pennsylvania, and the other, bishop for New York. Meanwhile, the American Church had given guarantees to the Archbishop of Canterbury that it neither desired to nor intended to "depart from the Church of England in any essential point of doctrine, discipline or worship, or further than local circumstances require." In 1790 James Madison

was consecrated at Lambeth for Virginia, and the Anglican line of succession was canonically established in America.

Constitution and Order. In 1789 a second convention, properly the first general convention of the church, was held, and Bishop Seabury, with a delegation from New England, joined in it; yet the three bishops sat and voted with the deputies. The constitution, as finally framed, is substantially as above described. The general convention is the supreme legislative authority; the standards of faith (though little reverence is paid to the Thirty-nine Articles in practice) and the rule of worship are in the *Book of Common Prayer*, and these are regarded as unalterable as to their substance, though rubrics and minor ritual methods may be changed. A bishop can only be tried by his peers, and the process is intricate. Each diocese is constituted on the plan of the general convention, has entire control over the discipline of priests and deacons, and votes by orders. The subscription of the clergy to the formularies is relaxed, and the candidate for orders, instead of declaring his *ex animo* assent to them, after the English usage, is required to make the more negative promise of conformity to the doctrine and worship of the church.

The *Prayer-Book* as revised in 1789 was a return from the *Proposed Book* to the English model. To it Seabury succeeded in adding the invocation from the Scotch Communion office, giving a high eucharistic quality to it. It omits the so-called Athanasian creed, provides a form of family prayer, and later there were added a *Form for the Consecration of a Church or Chapel* (1799) and one for the *Institution of Ministers* (1804). A final revision of this book began in 1883, and was nine years in progress. It aimed only at liturgical enrichment and a greater flexibility of services. The changes had no doctrinal significance. This church puts forth its own hymnal, and it is one of the best collection of hymns extant for dignity and lyric force.

Recent History. In trying to be a national rather than a dogmatic organization, the Church of England became comprehensive. Puritan and prelatist, Calvinist and Arminian at first fought in it fiercely; but it was in it, and each party asked, not for toleration, but domination, until the time of William III. Its breadth no bitterness of the schools has wholly obliterated, though the partisan leaders would at times, if they had their way, mar its fair catholicity. The great mass of Episcopalians cleave to a dogma, not clearly stated in the church's confessions, and only inferentially gathered from its rubrics and canons. It is that a tactual succession of bishops from apostolic times is vital to the being of a church, and only episcopally ordained men can administer valid sacraments. Only those who do not believe this dogma are made unwelcome to the hospitable embrace of this communion. By law, in the Church of England, a minister of a Protestant continental church may hold a living in that communion, if he can find a patron to collate him to it, but no Dissenting clergyman of the realm may do so. This seeming paradox grew out of the national character of the church. It was friendly to national churches; it looked upon dissent at home as seditious. Not until 1868 did the Protestant Episcopal Church finally and definitely exclude from occasional ministrations in its congregations men not in episcopal orders. At that time a Mr. Hubbard had been brought to trial in Rhode Island for inviting a Baptist minister to pronounce the absolution in his parish church. The canon already mentioned, formed to exclude unworthy Episcopal clergymen from service in the church, had undergone some verbal re-arrangement and its primitive purpose no longer existed. It was alleged that Hubbard had violated it, but the court acquitted him on the ground that the canon did not contemplate such an act at all, or had no relation to the invited services of ministers of other denominations. At that time the General Convention was in session and the canon was reconstructed, so that its prohibition of ministrations of clergymen not in Episcopal orders should thereafter be undoubted. In 1867 Charles E. Cheney was tried in Illinois for having omitted to pronounce infants regenerated by the Holy Spirit in baptism, according to the formulary of the baptismal office, and suspended. Suspension ended in six months in deposition because he would not promise to conform. In 1891 Howard MacQueary was forced from the ministry in Ohio for calling in question the miraculous conception of Christ and the resurrection of the body. All these trials were in diocesan courts, from which there has thus far never been provided any appeal, except to the diocesan bishop. Hence it is quite possible that what is heresy in one diocese might be found orthodox in another. Were the church at all given to heretical prosecutions, the lack of an appellate court might be found to be of disintegrating consequence.

In 1819 the General Convention created a Domestic and Foreign Missionary Society. It was a compromise between the High and the Low churchmen of that day. The Low party had upbraided the piety of High churchmen as not sturdy enough to seek the conversion of the heathen, to which reply was made, "We wish first to take possession of the United States." By tacit arrangement, foreign missions were intrusted to the Evangelicals and domestic missions to the Anglicans. But domestic missions made dioceses and dioceses made the General Convention. The consequence was, that the Low-church party steadily declined until it may almost be said to have no organization save some inactive or small societies. In their place arose a Broad-church school to contend for the comprehensiveness of the church, and it is naturally antagonized by ritualists and evangelicals.

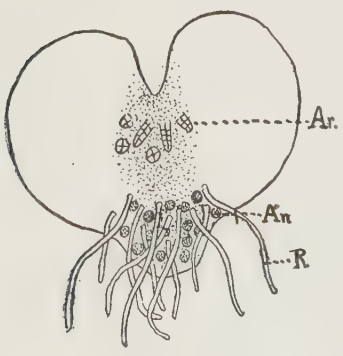
In 1835, stirred by the splendid generalization of Bishop Doane, that "the church is a missionary society and every baptized person is a member of it," the General Convention reorganized the Missionary Society. Every bishop is a member of its board, and the convention appoints upon it clerical and lay representatives for every diocese. It meets every three years and intercalates its sessions with those of the General Convention.

Statistics. The diocesan and missionary reports

to the triennial General Convention of 1894 resulted in the following statistics:

There were 52 dioceses and 18 domestic missionary jurisdictions. China, Africa, Japan and Haiti had missions with resident Episcopal supervision; Cuba, Greece and Mexico had missions under the supervision of an appointed diocesan bishop at home. At that time there were 78 active and 3 retired bishops; 4,323 priests and deacons; 4,870 organized parishes and missions; 580,507 communicants, and 400,566 Sunday-school scholars. The total contributions for the preceding year were over $12,000,000; $211,000 was raised for domestic and $158,000 for foreign missions. There were 4 religious orders for men, 22 sisterhoods and 5 communities of deaconesses. The theological seminaries are: the General Theological Seminary in New York, under control of the General Convention, and of those not so controlled, one each in Middletown, Connecticut; Geneva, New York; Philadelphia, Pennsylvania; Cambridge, Massachusetts; Davenport, Iowa; Washington, District of Columbia; Nashotah, Wisconsin; Syracuse, New York; Faribault, Minnesota; Alexandria, Virginia, and Chicago, Illinois. There are eight colleges under denominational control: Griswold, at Davenport, Iowa; Hobart, at Geneva, New York; Kenyon, at Gambier, Ohio; Lehigh University, at South Bethlehem, Pennsylvania; Racine College, at Racine, Wisconsin; St. Stephen's, at Annandale, New York; Trinity at Hartford, Conn.; and the University of the South, at Sewanee, Tenn. In 1901 there were 6,686 churches, 4,961 clergy and 716,431 communicants. D. O. KELLOGG.

PROTHALLIUM, the name applied to the gametophyte of ferns and their allies (*Pteridophytes*). The ordinary leafy plant is the sporophyte, which produces spores upon its leaves, but bears no sex organs. When the spores germinate they produce a distinct plant, the prothallium (gametophyte), which bears the sex organs The accompanying figure represents the prothallium of an *Aspidium*. It is a small, flat, green body, whose lower surface is shown in the figure. The female organs (archegonia) are represented at *Ar*, the male organs (antheridia) at *An*, and the roots (rhizoids) at *R*. See REPRODUCTION, Vol. XX, p. 442; and ALTERNATION OF GENERATIONS and MORPHOLOGY, in these Supplements.



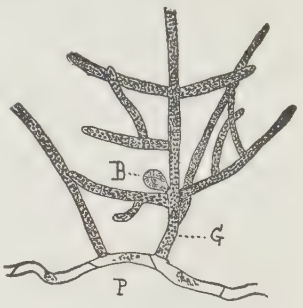
PROTHALLIUM.

PROTISTA. See PROTOZOA, Vol. XIX, p. 853.

PROTOCOCCOIDEA. See VEGETABLE KINGDOM, Vol. XXIV, p. 137.

PROTOGYNY, a botanical term applied to those cases in which the stigmas of a flower mature, as shown by being ready to receive pollen before the anthers are mature, as shown by shedding pollen. In such a case the stigmas must receive pollen brought from some older flower. See POLLINATION, in these Supplements.

PROTONEMA, a term applied to that alga-like branching structure in mosses, which develops directly from the spores, and upon which the leafy plants arise as lateral shoots. The accompanying figure represents the protonema of *Funaria*, which has developed from one of the spores shed from the capsule. The green (chlorophyll-containing) part is that which is shaded in the figure (*G*), while the colorless or brown part (*P*) was beneath the substratum and away from the light. At *B* is a bud which develops into the leafy axis known as the ordinary moss plant.



PROTONEMA.

PROTOPHYTA. See PROTOZOA, Vol. XIX, p. 853.

PROTOPLASM, ANIMAL. See EMBRYOLOGY, in these Supplements.

PROTOPLASM, PLANT. See MORPHOLOGY, in these Supplements.

PROTOPTERUS. See LEPIDOSIREN, Vol. XIV, p. 468.

PROTOTHERIA. See MAMMALIA, Vol. XV, p. 374.

PROTRACHEATA. See MYRIAPODA, Vol. XVII, pp. 123, 124.

PROUT, FATHER. See MAHONY, FRANCIS, Vol. XV, pp. 290, 291.

PROVERBS. A proverb is an old and common saying, which contains some well-known truth or fact ascertained by experience or observation. It is generally short and pithy, with an undercurrent of wit. A saying, to be a proverb in the common acceptation of the term, must be in popular use, and must be of such sense and construction as to permit of its being used to express and illustrate more than a specific idea. If a saying, although brief and pithy, be only applicable to use in some one line of conversation, it is not, strictly speaking, a proverb. A proverb to be a proverb must be of such long and general use that it is marked with the stamp of approval and accepted by the people. A wise man's saying may be ever so wise, pithy and pointed, but it is only *his* saying, and nobody is bound to take it as a settlement of any question. In this respect proverbs and ballads are precisely on the same basis: they derive their authority from popular suffrage. But there is a difference between them, that the ballad had a maker, but no one man ever made a proverb. He may have made the original saying, but the forces that made the proverb were entirely beyond his control. Proverbs travel from family to community, from community to nation, and from nation to the world. A great number of modern proverbs are of Eastern origin—have come from the Arabic and Persian to the English. A proverb, it is said, gives its own origin from the sense conveyed by it and the method of the saying; it reflects the people with whom it originated.

Taking proverbs from a national standpoint, the Spaniards rank first; the number is prodigious. The Anglo-Saxon countries of continental Europe were rich in proverbs. The Norse had numerous proverbs. The literature of Iceland is an evidence of this. The Celtic and Gaelic, while numerous, were lacking in originality, many of them being borrowed from the Norse. The Teutonic group of nations had their proverbs in common, with provincialisms cropping in. Of the nations of the East, the Arabs hold first place, followed closely by the Persians, Hindustani and Turks. The Malay prose literature in popular use is composed almost entirely of proverbs. Collections of proverbs of every nation have been made, and are an interesting study. Arabic collections were made as early as the eleventh century, while in the nineteenth century the collecting has found votaries and made rapid progress in every country.

For collections of proverbs, English and foreign, see Bohn's *Handbook of Proverbs;* Bohn's *Polyglot of Foreign Proverbs;* Christy's *Proverbs and Phrases of all Nations;* Hazlitt's *English Proverbs and Proverbial Phrases.*

For the Biblical proverb, see BOOK OF PROVERBS, Vol. XIX, pp. 904 et seq.

PROVIDENCE, capital of Rhode Island. The predominant interest of Providence is no longer commerce but manufactures, the census of 1900 ranking it high among American cities in the value of its products; 1,933 industries reported. These had an aggregate capital of $83,513,000, employed 42,693 hands and had annual products averaging $88,168,897. Out of the total, the value of the cotton products was $3,355,000, this being one of the chief cotton markets of the Northern states; the woolen and worsted goods, $18,375,000; the jewelry products for the year amounted to $12,719,124, and the foundry and machine shop products, $9,437,251. An extensive system of street-railways, comprising 45 miles of track, connects all portions of the city and suburbs with the center. The Providence Telephone Exchange, organized in 1879, controls over fifteen hundred miles of wire. The city is lighted both by gas and by electric light. It has also an extensive system of water-supply and sewerage. There are 15 newspapers, four being dailies. In the ratio of its valuation to its population, Providence ranks as one of the wealthiest of American cities. Brown University (q.v.) is located here. Population 1890, 134,146; 1900, 175,597. See also PROVIDENCE, Vol. XIX, pp. 909, 910.

PROVINCETOWN, Massachusetts, a town and summer resort of Barnstable County, occupying the northern extremity of Cape Cod Peninsula, opposite Plymouth on the mainland side of Cape Cod Bay, and reached by rail from Harwich, 30 miles to the south. It was one of the landing places of the Pilgrim Fathers; has a well protected land-locked harbor inside Cape Cod and has been a busy sea-fishing center from early colonial times. Population, 1890, 4,642; 1900; 4,247. C.L.S.

PROVO, Utah, a river flowing into Utah Lake near Provo City, after a west by south course of 160 miles from its source in Bald Peak, one of the Uinta Mountains. Its waters are utilized for irrigation. C.L.S.

PROVO CITY, a city and the capital of Utah County, central Utah, on the Provo River, near Utah Lake, and on the Salt Lake and Los Angeles and the Union Pacific railroads, 40 miles S. of Salt Lake City. It is the trade-center of a rich farming region, which produces wheat, barley, grass, live-stock, etc., and an important manufacturing and shipping point for flour. Several tanneries and flour-mills are located here. Population 1890, 5,159; 1900, 6,185.

PROVOOST, SAMUEL, an American clergyman; born in New York, March 11, 1742. He graduated at King's College (now Columbia University) in 1758, and later studied at St. Peter's College, Cambridge. He was ordained priest in 1766, and became assistant minister of Trinity Church in December of that year. Two years later he retired to a farm in Dutchess County, and occupied himself in literary and scientific pursuits. After the war he was chosen rector of Trinity Church, a position he held for nearly 17 years. He was elected bishop of New York in June, 1786, and, with the assistance of a coadjutor, held that office till his death, which occurred in New York, Sept. 6, 1815. E.E.T.

PRUDDEN, THEOPHIL MITCHELL, physician; born in Middlebury, Conn., July 7, 1849; was graduated at Sheffield Scientific School in 1872. He was professor of pathology in the College of Physicians and Surgeons, New York; contributor to medical magazines, and author (with Dr. Francis Delafield) of *Manual of Normal Histology; Story of the Bacteria; Dust and Its Dangers; Water and Ice Supplies*, etc. He received the degree of LL.D. from Yale University in 1896. He is a member of the National Academy of Sciences. G.J.H.

PRUSSIA, KINGDOM OF. (For general article giving geographical, geological, and historical descriptions, see PRUSSIA, Vol. XX, pp. 5–24.) In 1820 the income of the King of Prussia was fixed at $1,930,824. Previous to that time the king enjoyed the entire income of the state domains. In 1859 an additional allowance was made, and again in 1868 and 1889, until in 1895 the king's total income was $3,852,720, as far as it figured in the budget. But in addition, the reigning house controls many castles, forests, and estates from which a large revenue is derived. The area of Prussia is reported officially as 134,603 English square miles. The population in 1900 aggregated, in the 14 provinces, 34,472,509. The average density per square mile was 256.0. The area at the close of the reign of Friedrich I, King of Prussia, in 1713, was about 43,400 square miles; in 1797, the area was 118,030 square miles; from 1816 to 1858, 106,614; from 1858 to 1867, 108,514; in 1890, 134,603.

Of the total population in 1900, 51.4 per cent lived in towns. The population included 16,971,472 males, and 17,501,084 females, or 103.12 females per 100 males.

AREA AND POPULATION BY PROVINCES.

PROVINCES.	AREA IN SQ. MILES.	POPULATION, 1900.
East Prussia (Ostpreussen)	14,282	1,994,626
West Prussia (Westpreussen)	9,854	1,563,658
Berlin	25	1,888,848
Brandenburg	15,381	3,108,554
Pomerania (Pommern)	11,628	1,634,832
Posen	11,184	1,887,275
Silesia (Schlesien)	15,566	4,668,857
Saxony (Sachsen)	9,750	2,832,616
Schleswig-Holstein	17,337	1,387,968
Heligoland*	(0.23)	.....
Hanover (Hannover)	14,869	2,590,939
Westphalia (Westfalen)	7,803	3,187,777
Hesse-Nassau	6,060	1,897,981
Rhine (Rheinland)	10,423	5,759,798
Hohenzollern	441	66,780
Total	134,603	34,472,509

POPULATION OF PRINCIPAL TOWNS, DEC. 1, 1900.

TOWNS.	POPULATION.	TOWNS.	POPULATION.
Berlin	1,888,326	Essen	118,863
Breslau	422,738	Posen	117,014
Cologne (Köln)	372,229	Kiel	107,938
Frankfort-on-Main	288,489	Krefeld	106,928
Hanover	235,666	Kassel (Cassel)	106,001
Magdeburg	229,663	Erfurt	85,190
Düsseldorf	213,767	Wiesbaden	86,086
Stettin	210,680	Duisburg	92,729
Charlottenburg	189,290	Gorlitz	80,932
Königsberg	187,897	Frankfort-on-Oder	61,835
Altona	161,507	Potsdam	59,814
Elberfeld	156,937	Münster	63,776
Halle-on-Saale	156,611	Spandau	65,014
Dortmund	142,418	Bochum	65,554
Barmen	141,947	München Gladbach	58,014
Dantsic (Danzig)	140,539	Liegnitz	54,839
Aachen	135,235		

CONSTITUTION AND GOVERNMENT. The Constitution of Prussia has undergone many revisions. The last two were on Feb. 19, 1879, and May 27, 1888. The fundamental laws vest the executive and part of the legislative authority in the king, who attains his majority at the age of eighteen. The crown is hereditary in the male line, and in the order of primogeniture. In the exercise of the government the king is assisted by a council of ministers appointed by royal decree. The legislative authority the king shares with a representative assembly, the Landtag, composed of two chambers, the first called the "Herrenhaus," or House of Lords, and the second the "Abgeordnetenhaus," or Chamber of Deputies. The assent of the king and both chambers is requisite for all laws. Financial projects and estimates must first be submitted to the second chamber, and either accepted or rejected *en bloc* by the upper house. The right of proposing laws is vested in the government and in each of the chambers.

The upper chamber is now composed of, first, the princes of the royal family who are of age, including the scions of the formerly sovereign families of Hohenzollern-Hechingen and Hohenzollern-Sigmaringen; secondly, the chiefs of the mediatized princely houses, recognized by the Congress of Vienna, to the number of 16 in Prussia; thirdly, the heads of the territorial nobility formed by the king, and numbering some fifty members; fourthly, a number of life peers, chosen by the king from among the rich landowners, great manufacturers, and "national celebrities"; fifthly, eight titled noblemen elected in the eight older provinces of Prussia by the resident landowners of all degrees; sixthly, the representatives of the universities, the heads of "chapters," and the burgomasters of towns with above 50,000 inhabitants; and, seventhly, an unlimited number of members nominated by the king for life or for a more or less restricted period.

The second chamber consists of 433 members—352 for the old kingdom, 80 added in 1867 to represent the newly-annexed provinces, and 1 in 1876 for Lauenburg; the proportion to the population in 1895 was 1 to every 73,569.

The king of Prussia and his chief ministers of state are the same as those of the German Empire (q.v., in these Supplements).

EDUCATION. Education continues to be compulsory in Prussia. Schools have local support with state aid. All parents must have their children properly taught or send them to one of the elementary schools, in which all fees are now abolished. No compulsion exists in reference to a higher educational institution than elementary schools. The school age is from 6 to 14, and the number of that age in 1896 was 5,654,918. In the budget of 1901–02, the sum of $31,868,850 was appropriated for instruction. Of this sum, $3,704,000 was for science, art, and technical instruction.

EMIGRATION. In 1892 the emigration from Prussia by German ports, Dutch ports, and Antwerp reached a total of 76,196; in 1893, 53,471; in 1894, 24,203; in 1895, 20,564; in 1896, 19,459; and in 1897, 13,497.

FINANCE. The budget estimates for the year ending March 31, 1901, placed the revenue at $618,066,500, and the total expenditure at the same amount.

The national debt of the kingdom, inclusive of the annexed provinces, was, according to the budget of 1900–01, $1,650,700,616.

The charges for interest, amortization, and management of the debt amounted to $68,236,876 in the same financial year (1900–01).

The debt amounts to about $47.08 per head of population, and the annual charge to about $2.00 per head. In 1890 the total of incomes was estimated at $2,500,000,000, and the average per head $85.50. The income-tax averages about sixty cents per head of population. Since April, 1895, only the income-tax and a new tax (Vermögenssteuer) are direct state taxes.

PRODUCTIONS IN 1899–1900. Among the summaries of the reports were the following: Establishments for manufacturing beet-sugar, 308; which consumed 9,767,741 metric tons of beet-root, in the production of 1,339,270 metric tons of raw sugar. There were 5,103 breweries in operation, brewing a sufficient quantity of beer to supply 22.44 gallons yearly to every inhabitant of the kingdom.

The coal-mines reported an output in 1900 of 101,966,158 tons. Prussia yields about half of the world's annual production of zinc, 155,760 tons.

* Heligoland has been attached to Schleswig-Holstein since 18

Yield of lead, 116,995 tons; copper, 30,902 tons. Total value of mining products in 1899, $227,600,000.

PRYOR, Roger Atkinson, an American jurist and public man; born in Dinwiddie County, Va., July 19, 1828. He graduated at Hampden-Sidney College in 1845, and at the University of Virginia in 1848; was admitted to the bar, and practised a short time in Petersburg. He was engaged in newspaper work in Washington and Richmond, 1852–55; was special commissioner to Greece, 1855; returned to the United States and established *The South* in 1857, and later joined the staff of the Washington *States*. He was a Representative in Congress from Virginia from Dec. 7, 1859, to March 3, 1861; joined the Confederate army as colonel in 1861, and was brevetted brigadier-general in 1863; was a member of the Virginia (Confederate) House of Representatives, 1862; and was a prisoner of war in Fort Lafayette, 1864–65. After the close of the war he practised law in New York, and in 1890 was elected to the bench. E.E.T.

PSYCHICAL RESEARCH, Society for. See Telepathy, in these Supplements.

PSYCHOLOGY is the study of the phenomena that arise within the domain of the human mind, or in other words, of the facts of consciousness. Inasmuch as the content of the mind is the sum of a man's knowledge, for what is not presented in consciousness does not exist for an individual, it is evident that the science of mind is an all-embracing one. It is true that psychology is not concerned with the contents of the mind, but only with the way in which the mind acquires and deals with them. Still, the relation of the mind to its entire world of facts is not only a very large field for investigation, but, in many particulars, an obscure and debatable one. Confusion is increased because, as yet, psychologists lack a precise terminology, such as makes other sciences exact. Again, the subject is implicated with other fundamental departments of thought, and it also breaks up into various branches, while it is approachable from many standpoints. All metaphysics, or speculative philosophy, takes its origin in the mind, and with it the grounds of religion are laid. There could be no metaphysic if there were no mind; there could be none were mind proved to be a physiological result, for then mind would be purely material and metaphysic would become identical with physics. Speculative philosophy begins with assumption of the Ego or subject. It develops through a determination of the constitution of the Ego or of mind, and of its intuitions and categories. Upon these, and the question whether volition is determined or free, depends the authority of religion and the validity of morals.

Now, it is possible to free psychology from all speculative considerations, and to restrict it simply to the study of facts as they arise in consciousness, without inquiry as to the nature of the mind, just as it is possible to classify plants without attention to vegetable physiology, or to study mechanics without inquiry into physics. It is concerned with the *how*, and not the *why*. In point of fact, it is just this restricted research that constitutes the science of psychology to-day. Such is the presentation of this subject in the article on Psychology, in Vol. XX, pp. 42–90, of this Encyclopædia. That article carefully marks the line which separates physiology from psychology. It belongs to the school of British thought, is especially influenced by the philosophy of the Realistic or Scotch Common-Sense reasoners, and owes but little to the German psychologists of the Wundt or physiological school. It is written rather on the lines of introspection, assuming the existence of the Ego as subject, taking the normal individual for its standpoint, laying a basis in its categories for intuition, and leaving the freedom of the will in a limited limbo. (See pp. 42, 44, 49, 72, 79, and 88.) This does not materially affect its results, for experimental psychology has not yet grown to an impeachment of them, and in them the pedagogist will find all the material commonly used in the scientific consideration of education. It may be classified as belonging to both the *empirical* and the *introspective* school, the first of which is defined as "the study of observed facts of consciousness and of their laws, without attempting to account for them by underlying principles," and the second as "based on introspection, or the observation of personal consciousness."

It will be clear, on reflection, that speculative philosophers, theologians, and orthodox moralists will hardly leave so fundamental a province as psychology without a theory and a method. From the days of Chilon, one of the "Seven Sages of Greece," his injunction, "Know thyself," has had a profound and fundamental relation to philosophic thought. For centuries psychology had its devotees, but they treated it as a part of metaphysic. When it began to be separated from speculation, and made a special branch of study, as in Locke's *Essay Concerning the Human Understanding*, it came to be known as "Mental Science." Under this title it passed into the curriculum of schools and colleges, and it was not until the middle of the nineteenth century that the term "psychology" came into English vogue, chiefly through the influence of the works of the Germans, Carus and Herbart. Until within recent years, mental science was more or less compromised with philosophy and ethics, and its expounders continued to seek the "underlying facts of consciousness, or to derive such facts *a priori* from the concept of the soul." This school has been called that of *rational psychology*, but its methods and postulates have become obsolete, although it did much to clear the way for those who came after.

For additional facts on this subject, see Hickok's *Empirical Psychology;* Porter's *Human Intellect;* McCosh's *Truths;* Spencer's *Education;* Bain's *Education as a Science;* Payne on *The Science and Art of Education;* Baldwin's *Handbook of Psychology*, and *Mental Development in the Child and the Race;* and Sully's *Teacher's Hand-Book of Psychology.*

PSYCHROMETER, an instrument for measuring the relative humidity of the air. (See HYGROMETER, Vol. XII, pp. 604–605.) It consists of two thermometers, a wet bulb and a dry bulb. The *sling* or *whirled psychrometer* is moved swiftly through the air to insure more rapid evaporation.

PUBLIC LANDS OF THE UNITED STATES are lands which are owned by the government. The term, in its wide and general usage, has especial reference to such lands owned by the government as are open to sale, or any other method of disposal, to persons who will comply with stipulations of the law. In 1893 the total area of United States vacant lands was estimated at 568,000,000 acres, located in 25 states and territories. Much the largest part of these lands was west of the 100th meridian, and 542,000,000 acres (or 95 per cent) were in states and territories west of the Dakotas, Nebraska, Kansas and Texas. East of these states there were 26,000,000 acres, located partly in the swamps of Florida and Louisiana, and partly in Arkansas, Michigan, Wisconsin and Minnesota, in what have, in the past, been widely represented as non-agricultural regions. The exhaustion of the more attractive and desirable public prairie-lands has, however, turned attention toward the others, particularly in the three Northern states mentioned, and, upon investigation, the so-called pine-barren and alleged worthless lands are, in many cases, proving to be quite otherwise.

In 1890 there were 12,798,837 acres disposed of by the government. The figures dropped, in 1891, to 10,477,700 acres, and in 1892 again rose to 13,664,019 acres. Therefore, taking the annual average disposal at 12,000,000 acres, and supposing all the vacant land to be susceptible to entry, it would all be taken up in fifty years. As a matter of fact, however, only a small portion of the vast area can be acquired under the present laws, or is now suitable for homestead purposes. A great deal of it consists of high mountains, lava-covered plains or eroded plateaus, or is otherwise too rough. The portions which are now, perhaps, the choicest—in that they possess a rich and deep soil—are, for the most part, valueless at present because of aridity. It has been possible to redeem portions of these lands through irrigation; but the area within reach of a visible water-supply is small, and, at the present rate, will all be gone in a few years. Speculations as to the length of time before it will become exhausted have led the public attention to the questions bearing upon their reclamation; inasmuch as men are now, every year, more and more disposed to take lands which, a few years since, were regarded as undesirable. Therefore, the amount taken from year to year must now diminish, not because of a decreasing demand, but through an inadequate supply. The eleventh census shows that the area irrigated in 1889 was 3,631,381 acres, which area was located in scattered patches between the 100th meridian and the Pacific Coast. The total land-surface in this area, which possesses almost every imaginable combination of soil and climate, is (deducting 36 counties in western Oregon and Washington) 883,312,000 acres, and the area irrigated is only four tenths of one per cent of the enormous territory. These lands may be divided into four classes; viz., desert lands, pasture-lands, timber-lands, and firewood-lands. 1. The desert lands are those areas where cattle are unable to obtain drink, and where the vegetation is so ephemeral as to be of little value for pasturage; the soil, however, is often rich, and when watered has given forth prolific crops. These "deserts," even in the natural state, are seldom entirely without vegetation, and often, during a brief portion of the year, are covered with a variety of verdure both surprising and beautiful. 2. The pasture-lands are the great plain and other regions (including the mountain valleys and parks) which are available for pasturage. 3. The timber-lands are the forest areas upon the mountains, where the trees are large enough for timber. 4. The firewood-lands are those which lie intermediate between the pasture-lands and the high slopes, which may be said to fringe the timber-lands, where the tree-growths are not large enough for timber use. It may be added, however, that there are scattered here and there within this area, called the firewood belt, certain strips and patches of land which are capable of productiveness without the aid of irrigation. The percentage of such lands cannot now be computed, and although not great as compared to the whole, still would amount to considerable in the aggregate. It will therefore be included in the firewood area. The divisions, therefore, are as follows:

	Acres.
Desert land	64,000,000
Pasture-land	620,912,000
Timber-land	83,200,000
Firewood-land	115,200,000
Total	883,312,000

Of this total, less than 568,000,000 acres still belong to the general government. The irrigated and irrigable lands are mainly included within the division known as pasture-land; and, in a general way, it may be stated that nine tenths of this area is covered with a fertile, arable soil which only lacks moisture to render it highly productive. These figures are partially assumed, but are based upon good grounds and careful estimates; and if they are proven, then, out of, say, 616,000,000 acres of arable lands within this pasturage area, less than three fifths of one per cent were irrigated in the census year. The reclaimability of the balance is simply a question of water-supply, and the providing of an adequate supply of water some time in the future is by no means to be regarded as a wholly visionary or impractical dream. The vast areas of public lands in Alaska are scarcely within the possible range of computation, and are not included within the above estimates. For ways of acquiring public lands, see HOMESTEAD, Vol. XII, pp. 125–127; also,

under the *Timber-Culture* and *Desert-Land* laws, see UNITED STATES, in these Supplements.

PUBLIC SCHOOLS. See SCHOOL, PUBLIC, in these Supplements.

PUCCOON, a name applied to several plants of widely separated families: 1. Species of *Lithospermum*, a genus of *Boraginaceæ*, otherwise known as gromwells; 2. *Hydrastis Canadensis*, belonging to the family *Ranunculaceæ*, or crowfoots, and known as yellow puccoon; and 3. *Sanguinaria Canadensis*, a plant of the *Papaveraceæ*, or poppies, commonly known as blood-root. In all these cases the name has been given on account of the colored root-sap, which has been used more or less as a dye.

PUDDLING. See IRON, Vol. XIII, pp. 329–334.

PUEBLA, a state. See MEXICO, Vol. XVI, pp. 223, 226.

PUEBLO, a city of southern Colorado, and one of the most prosperous between the Rocky Mountains and the Missouri River, the capital of Pueblo County, Colorado. It is located on the Arkansas River, 115 miles S. of Denver, 40 miles E. of Cañon City, and is reached from all directions by the Denver and Rio Grande, Denver and New Orleans, Atchison, Topeka and Santa Fé, Rock Island, and other leading transcontinental railway lines. As a manufacturing city, railroad center, and in some other respects, Pueblo is second in importance to no city in southern Colorado. It is the location of the Colorado Coal and Iron Company, Colorado Smelting Company, Colorado Pressed Brick Company, Colorado Bridge Company, and many other undertakings owned and controlled by home capital. These embrace foundries and machine-shops, enterprises devoted to the manufacture of wire fencing cornices, brick, furniture, lumber, sashes, doors and blinds, carriages, buggies and wagons, agricultural implements, mining machinery, etc., representing heavy investments, and employing a large force of skilled artisans. It has three daily and several weekly papers, one private and two national banks, seven churches, a number of schools (graded and commercial), a large number of stores, eight hotels, two theaters, the State Agricultural Society and the State Asylum for the Insane. It is lighted by gas and electric lights, and a well-managed street-railway system affords the means of rapid transit throughout the city. Population 1890, 24,558; 1900, 28,157.

PUEBLO INDIANS OR PUEBLOS, families of North American Indians, found, in the sixteenth century, by the Spanish explorers in Mexico, New Mexico and Arizona. They are included in four linguistic families, representing 28 tribal groups, living in as many villages. These Indians were originally small people, the men averaging not more than five feet in height. The men were lean, rather sharp-featured, dark or tawny, expression mild and intellectual The women were fair olive. Their clothing was, for the most part, made of woven bark, yucca-fiber, cotton or cottonwood-down, fur and feathers. The men wore robes of rabbit-skin or catskin, or mantles of cotton elaborately striped and embroidered, buckskin tights, or else leggings made of strips of buckskin wound around the leg like a bandage, and fastened at the knee with garters of colored cotton yarn. Sandals of yucca, sometimes moccasins of buckskin with rawhide soles, protected the feet. The warriors wore helmets made from the skin of the bear, puma, antelope or bison; their shields were of basket-ware or rawhide; their weapons were lances, javelins, bows, clubs, knives of flint or obsidian, stone axes, and swords whose edges were of some flinty material. The women wore a sleeveless dress of cotton reaching below the knee, a mantle of embroidered cotton, a head-shawl, leggings and sandals, or for the house knitted stockings. Their hair was parted in the middle, and tied in two knots back of the ears for the married ones, and in two coils over the ears for the unmarried.

Their houses were clustered into villages, in form either rounded or oblong squares. They were several stories in height, the highest being on the outer side, the others descending in terraces to central open courts and alleys. There were no doorways in the lower stories, access being gained to the roofs of the houses by means of ladders, which could be raised at any time for protection from enemies. The houses themselves were entered through scuttles in the roofs. The upper stories had both doors and windows. Each house was divided into rooms, all of which were very small. Each household occupied three or four of these rooms. There was always a kitchen, a storeroom, and an eating and living room. The village was divided into wards of the same number as the tribal divisions, and each ward into quarters equal in number to the clans of each division. The women and children lived in the quarters, the men in large, partly underground chambers, one for each division of the tribe. In these chambers they held their councils, and labored at their looms, or made their weapons of war. In them they also amused themselves, taught the young the usages and traditions of their respective divisions, and settled disputes between the clans.

The men were the weavers and spinners. They irrigated the land and raised the crops. The women cared for the household, cooked the food, made pottery, baskets and utensils for the house. They also had small gardens just outside the village, where leeks, peppers and fragrant herbs were raised. The supply of meat is obtained by the divisions joining in round-ups of game. Dams, ditches and embankments for irrigation, at a distance from the village, are also made by the divisions working together, so as to be able to resist the attacks of neighboring tribes.

The tribes were composed of clans, and the clans of families of kindred. Each clan was named after some animal, plant or other thing, which name was the "totem" of the clan. Clans whose totems were analogous were grouped together to

make a division. Thus the Sunclan and the Eaglecian were in the same group, as the sun and the eagle both dwelt in the sky. Each group had its priest, chief or "medicine-man," who was the keeper of the powers of the spirit of the animal or thing of the region which his division represented. These divisional priest-chiefs were from four to seven in number. There were, also, secret societies, or cults, or fraternities, of these priests, the members of which were the teachers and keepers of the traditions, rituals, religious regulations, magic mysteries and medicines or powers of the divisions to which they belonged. Disease was believed to be of ghostly origin, and these priest-doctors not only treated it, but labored to avert it by charms, rituals and offerings. The gods of the Pueblos were celestial gods, ancestral gods, phenomenal gods and animal gods, equally of both sexes. There was the supreme god, the god of the sun-shield, and under him the god of fate and his brother, the god of war, the god of time, of the seasons, and the god of dawn. The Master of Life was the Messiah of the Pueblos, the mediator between the mortal-like gods and the celestial. The natural world was the offspring of the spiritual world, and the hot springs of Colorado were the umbilical connection between these two worlds; accordingly, the offerings to the Master of Life were addressed by the priests of the cult societies at this place. Spiritual worship was largely hygienic. The priests abstained from meat four days each month, and for a number of days at the summer and winter solstices. Shells, coral, beads, etc., were sacrificed to the gods, and incantations and dances performed before altars which symbolized some sacramental region. Offerings of food and other articles were made in the autumn season, in remembrance of the dead, and in November of each year festivals and celebrations of creation were held.

A man and a woman of the same clan were not allowed to marry each other; lovers could not be betrothed without the consent of the priest-chief. Before betrothal, a man could display his preference for the woman of his choice only in a general way; after betrothal, the maternal relatives accepted the man as a perpetual guest of the clan, which placed divorce chiefly in the hands of the women. After the birth of a child, birth-offerings were made, and after nine days the child was presented to the sun, and the clan name given by the clanspeople of the mother, to whom it belonged ever after. Upon the death of a person, he was renounced by the clanspeople of the mother to the clanspeople of the father by breaking a jar of water beside the body. Presents were given; and if the dead had been a priest, he was buried and the presents were burned, if not a priest, the body was burned with the presents.

There is evidence for believing that the Pueblos once lived in regions to the north and east of the arid regions where they were found by the Spaniards. Their tribes were driven into the deserts by stronger tribes. Cultivation by irrigation became a necessity, and fixed habitats followed as a consequence. They built their huts of wood and mud, then their houses of stone and mud, and grouped them around watering-places. Fixed in habitation, tilling the soil and acquiring food-stores, they attracted the attention of their enemies, who forced them to fly to the cañons and cliffs, where they became cliff and cave dwellers, and developed the terraced and cellular type of architecture, the building of their villages in one, known as a pueblo, the dividing it into quarters—the men from the women—so peculiar to these people at the time of the Spanish conquest. This same general plan is still followed in the modern pueblos.

The ruins of houses and villages, thousands in number, which indicate the presence and movements of these people, are found from central Nevada, Utah, Colorado and Texas, southward into Mexico. Many of them are buried under the sands, to be unearthed only by accident. By far the greater number of these ruins are found upon the banks of the San Juan River and its tributaries, and upon the mesas in this vicinity, the largest group being located in the upper part of Cañon de Chaco. It is estimated that at the time of the Spanish conquest these Indians numbered 30,000. The total population at the present time is about 10,000. The modern Pueblos are found in greatest number upon or near the banks of the Rio Grande del Norte. Zuñi is near the western border of New Mexico, while the seven Moqui villages are in the northeast corner of Arizona. See also INDIANS, Vol. XII, 866–867.

PUERPERAL FEVER, childbed fever, or technically, *Puerperal Septicæmia*, a continued fever occurring in connection with childbirth. It is an infectious disease, produced by the action of bacteria which destroy tissue or indirectly poison the patient by producing toxic substances which are absorbed. The septic matter may be communicated by the hands of the physician or nurses, or by sponges, napkins, etc. The presence of bacteria produces an inflammation, the results of which are found in the uterus, the tissues around it, the veins and lymphatics. The peritoneum is nearly always affected, and swelling, softening, or abscesses may be found in the uterus, ovaries, kidneys, spleen, liver, lungs, muscles, and other tissues. The disease may begin within three or four days after delivery, or later, with headache, occasionally with a chill. The pulse becomes feeble and rapid, 130 or more a minute; the temperature rises to 103° or higher. Vomiting may occur, and diarrhœa is often very persistent. The tongue is coated with a heavy fur, and a filthy crust forms on the lips and teeth. There is often acute pain, with tenderness and swelling of the abdomen. The mammæ are often hard and painful, and the secretion of milk is arrested. As the disease progresses, the breathing becomes short and hurried, pneumonia, pleurisy or jaundice may develop, and the joints may swell and suppurate. The disease generally runs a rapid course, ter-

minating fatally within a week. In the final stage a clammy sweat appears, with hiccough, twitching of the tendons of the wrist, and muttering delirium, the patient dying from exhaustion. The disease is of such a serious nature that its treatment should always be prescribed by a physician. But there are always indicated the application of antiseptic douches to the affected parts, nutritious food and stimulants to sustain life. See also *Septicæmia*, under PATHOLOGY, Vol. XVIII, p. 558.

PUERPERAL INSANITY. See INSANITY, Vol. XIII, p. 115.

PUERTO LAMAR. See COBIJA, Vol. VI, p. 82.

PUERTO PRINCIPE, a province of Cuba. Population 1900, 88,234.

PUFFBALLS, the common name of species of the *Gasteromycetes*, a group of saprophytic fungi with large and usually more or less globular spore-fruits. The spores are borne in cavities in the interior of the globular mass, and escape by the drying and rupturing of the surrounding tissues. The puffballs proper are species of *Lycoperdon*, some of which become very large, and all of which are more or less edible.

PUGATCHEFF, YEMELYAN. See RUSSIA, Vol. XXI, p. 108.

PUGET SOUND. See WASHINGTON, Vol. XXIV, p. 406.

PUGH, JAMES LAWRENCE, an American public man; born in Burke County, Georgia, Dec. 12, 1820. He received an academic education in Alabama and Georgia; was taken to Alabama when four years old, where he permanently resided; licensed to practice law in 1841 and was employed so when elected to the Senate. He was a Taylor elector in 1848, Buchanan elector in 1856 and state elector for Tilden in 1876; was elected to Congress without opposition in 1859; retired from Congress when Alabama seceded from the Union in 1861. He joined the Eufaula Rifles, in the First Alabama Regiment, as a private; was elected to the Confederate Congress in 1861 and re-elected in 1863; after the war, resumed the practice of the law; was member of the convention that framed the state constitution of 1875; elected to the Senate in 1880 and re-elected in 1884, and again in 1890.

PUGILISM, the art or practice of boxing or fighting with the fists, especially as practiced in the prize-ring. In its milder form, under the name of boxing, contests of this character are described under WRESTLING AND BOXING, Vol. XXIV, pp. 725, 726.

Prize-fighting with bare knuckles has, with the advance of civilization, become illegal in nearly every country, and remarkable in this respect has been the advance and reform of popular opinion in America. Just as in England in Georgian days a prince regent would patronize the prize-ring, so in America a professional pugilist was at one time regarded as a species of popular hero. But the era of pugilism is past and gone. America has rivaled and outstripped the Old World in the number, and in many cases, in the severity of the criminal statutes of the separate states, rendering prize-fighting highly penal. But a few years ago the states with statutes directed against prize-fighting were less than half a dozen. In 1897 Nevada was the only state which had not legislated against degrading exhibitions of this character. In order to prevent the occurrence of prize-fights in less-settled districts, the Catron bill was passed through Congress Feb. 7, 1896, declaring prize-fighting illegal in the various territories, and prescribing severe punishments for the infraction of the law. Public opinion had become thoroughly aroused and decided against pugilists, and as a result of the rigid enforcement of the law, the year 1895 saw the principals in a contest of this description crossing to the neighboring republic of Mexico, where alone they were able to decide their differences. For those who care further to pursue the history of the "noble art of self-defense," as pugilism has been called, mention may be made of Egan's *Boxiana* (5 vols., 1818); *Fistiana* (1863); *American Fistiana* (1876); H. D. Miles's *Pugilistica* (2 vols., 1880); "*Pendragon's*" (Henry Sampson) *Modern Boxing* (1878); J. B. O'Reilly's *Ethics of Boxing and Manly Sport;* Pollock and Grove's *Fencing, Boxing and Wrestling*, in the Badminton Library Series (1889); and R. J. Allanson-Winn's *Boxing* (1890).

PUKHTO. See AFGHANISTAN, Vol. I, p. 213.

PULASKI, a village, one of the capitals of Oswego County, north-central New York, five miles from Port Ontario, on the lake of that name, 20 miles N.E. of Oswego, and 30 miles S.S.W. of Watertown, on the Rome, Watertown and Ogdensburg railroad; contains a courthouse and an academy; has two paper-mills, four flour-mills, two planing-mills, an iron foundry, a machine-shop and a cheese factory. Population 1890, 1,517; 1900, 1,493.

PULASKI, a village and the capital of Giles County, southern Tennessee, 67 miles S. of Nashville, on the Louisville and Nashville railroad; contains a jail, a courthouse and a fine town hall; also Giles College and the Martin Female College, two cotton-mills, two tanneries, and planing and flour mills. The village is in a farming and stock-raising district. Population 1890, 2,274; 1900, 2,838.

PULASKI, BOMBARDMENT OF FORT. This fort, situated on Cockspur Island, at the mouth of the Savannah River, defended the approach to the city of Savannah. During the Civil War it was bombarded and captured by the United States forces under General Gillmore. The besiegers used 36 pieces of artillery, placed along the shore of Tybee Island, at distances ranging from 1,650 to 3,400 yards. The first day's bombardment, April 10, 1862, lasting ten hours, made a partial breach, and to prevent the Confederates from repairing the damage by sand-bags, firing was continued throughout the night. The next morning the batteries were again opened and the breach rapidly enlarged, endangering the safety of the powder-magazine. At two o'clock the fort surrendered. The number of shots fired by the be-

siegers was 1,354, and of shells 4,221. In has been estimated that 110,643 pounds of metal struck the breached portion of the wall, equal to 2,458 pounds per lineal foot, and that the average distance of the guns from the wall was 1,687 yards.

PULASKI, Casimir, a Polish patriot and American revolutionary soldier; born in Poland, March 4, 1748. He fought bravely in fruitless endeavors to free his native country from the grasp of Russian tyranny, and, after a term of imprisonment under sentence of outlawry and death, fled to Turkey and thence made his way to France. In 1777 he arrived in Philadelphia bearing high recommendations from Franklin to Washington, and volunteered to serve in the American army. Four days after the battle of the Brandywine, in which he distinguished himself, he was commissioned commander of cavalry with the rank of brigadier-general. Later he organized a "legion" of cavalry and light infantry and joined Gen. Lincoln's command in the Department of the South. In the assault on Savannah, Ga., Oct. 9, 1779, he was mortally wounded, and, being borne on board the *Wasp*, died there Oct. 11, and was buried in the Savannah River. E.E.T.

PULITZER, Joseph, journalist, was born in Buda-Pest, Hungary, on April 10, 1847, received a classical education from private tutors, and came to America in 1863. He served as a private soldier in the Federal army in the closing year of the Civil War, and then settled in St. Louis, Mo., as a newspaper man. He was a reporter on the *Westliche Post*, edited by Carl Schurz, and later its managing editor and part owner. In 1878 he bought the *Dispatch* and the *Evening Post* of St. Louis and united them as the *Post-Dispatch*, which he still owns. Finally, in 1883, he purchased the New York *World*, made it the exponent of a "new journalism," and, in a short time, one of the best known papers in America. Since that time his chief attention has been given to the direction of the *World*. He has made the *World* an agency for the doing of some important public works, and in August, 1903, he gave the sum of $2,000,000 for the creation and endowment of a college of journalism as a department of Columbia University, New York. Mr. Pulitzer has long taken an active interest in politics, as a Democrat. He was a member of the Missouri legislature in 1869, and of the Missouri Constitutional Convention in 1874. He was elected a representative in Congress from New York for the term 1885–87, but resigned after a few months' service. He was a delegate to the Liberal Republican National Convention of 1872, and to the Democratic National Convention of 1880. W.F.J.

JOSEPH PULITZER.

PULKOWA, Observatory of The great observatory of Pulkowa, Russia, under its first director, W. Struve, who devised superior instruments, acquired great celebrity. Its work in the preparation of accurate catalogues of the principal fixed stars has been the standard for the world for many years. In 1885 a new refracting telescope of 30-inch aperture and 45 feet focal length was erected. The object-glass was made by Alvan Clark of Cambridge, Massachusetts, and the mountings by the Repsolds. The tube is cylindrical, of riveted steel plates, graduated in thickness from the center to its ends, and bolted by powerful flanges to a strong, short cast-iron central tube. A new feature of this instrument is the platform at the lower end, where an assistant can view the hour-circle by one eyepiece and the declination-circle by another, and where he can also set the telescope to any hour-angle by one wheel, or to any declination by another. The eye-end has a micrometer and its illumination for the position-circle, a finder, microscopes for reading the hour and declination circles, and an illuminated dial showing sidereal time, and driven by electricity from the sidereal clock. Provision is also made for the attachment of a spectroscope—all of which, on the authority of Otto Struve, are practical, and all that can be desired. The traveling-stages are the most manageable that have yet been devised. The driving-clock is constructed so as to be practically independent of the power applied to it, or of the force to be overcome. For general description, see Observatory, Vol. XVII, p. 734; and Telescopes, Vol. XXIII, p. 162.

PULLMAN, a town founded in 1880 by George M. Pullman, and since 1890 incorporated with the city of Chicago. It is situated 14 miles S. of the center of Chicago, on the west shore of Lake Calumet, and covers about five hundred acres of land. It is well laid out, and has a complete sewerage and water system, the drainage of the town converging to a central pool, from which the sewage is pumped to a farm three miles distant, and utilized there as a fertilizer. The town is beautified by well-kept open spaces and stretches, flower-beds and lakes. It has a good hotel, and in the Arcade Building a circulating-library and a small theater. In Pullman are located the car-shops of the Pullman Palace Car Company, employing about four thousand men; the Allen Paper Car-Wheel Works, Union Foundry, Standard Knitting Works, Terra-Cotta Works, etc., in all employing over six thousand hands. The ownership of all the dwellings is in the car company, the inhabitants being tenants. Provision is made, however, for those desiring to own homes to purchase them on lands adjoining the town. The best sanitary conditions and modern conveniences are secured for all, each paying a proportionate share toward the total cost of maintenance. At Pullman originated, in 1894, one of the severest and most widespread labor strikes of modern times (q.v., under *Strikes*, in United States, in these Supplements).

PULLMAN, George Mortimer, capitalist; born in Brocton, N. Y., March 3, 1831; acquired a public school education. In 1845 he became a clerk in a store and later was employed in the business of cabinet-making. In 1852–56 he was engaged in elevating buildings along the Erie canal. During this period he cleared about $6,000, with which he went to Chicago. His attention was there attracted to the sleeping cars in use on the Lake Shore railroad. These cars suggested to him the idea of a palace sleeping car. In 1859 the Chicago & Alton railroad gave him a contract to remodel two passenger coaches into sleeping cars. He then removed to Colorado, where he devoted himself to mining and other enterprises till 1863. In that year he returned to Chicago, and at a cost of $18,000 built the *Pioneer*, the first Pullman palace car, which made its maiden trip in Lincoln's funeral train. In 1867 he founded the Pullman Palace Car Company, which later had a capital of $40,000,000 and employed 14,000 persons. In 1880 he founded the town of Pullman, about twelve miles south of Chicago, of which it afterward became a part. He was connected with a number of financial and industrial concerns in Chicago and elsewhere. He died in Chicago, Ill., Oct. 19, 1897. G.J.H.

G. M. PULLMAN.

PULLMAN, James Minton, clergyman, brother of George M. Pullman, was born at Portland, New York, on August 21, 1836, and was graduated from the divinity school of St. Lawrence University, Canton, N. Y., in 1861. He became a Universalist minister, and was pastor of a church at Troy, N. Y., in 1861–68, of one in New York City in 1868–85, and since 1885 of one — the largest in America — at Lynn, Mass. He was secretary of the General Convention of the Universalist Church in 1870–78, and since 1886 he has been president of the Associated Charities of Lynn. He is also president of Dean Academy, Franklin, Mass., a director of the Massachusetts Prison Association, a member of the Massachusetts State Board of Charities, of the National Civil Service Reform League, of the Massachusetts Society for Promoting Good Citizenship, and of the National Conference of Charities and Corrections. W.F.J.

PULLMAN CARS. See Railroads, in these Supplements.

PULMONARIA. See Horticulture, Vol. XII, p. 259.

PULQUE, an intoxicating beverage of the Mexicans and of the inhabitants of Central America and some parts of South America, made from the fermented juice of various species of agave, mainly the maguey (*Agave Americana*), or American aloe. The sap of the plant contains much sugar, and, as pulque, is milky, sour and ill-smelling, resembling thin buttermilk. The Mexicans consume large quantities of it, and pulque-trains run into the cities as milk-trains do in the United States. It was first made by the Aztecs. See Aloe, Vol. I, p. 525.

PULSE, in physiology. See Vascular System, Vol. XXIV, pp. 113, 114.

PULSOMETER. See Steam-engine, Vol. XXII, pp. 541, 542.

PULU. See Hawaiian Islands, Vol. XI, p. 473.

PUMPELLY, Raphael, an American geologist and author; born in Owego, N. Y., Sept. 8, 1837. He was educated at the Owego Academy, and studied science and mining engineering in Paris, and in Freiberg, Saxony, in 1854–60. He has made extensive journeys for geological and other scientific purposes in Corsica (1860), Arizona (1860), Japan (1861–63), China and Mongolia (1863–64), the Gobi desert and Siberia (1864–65), Michigan and western Ontario (1867–1901), and Missouri (1871–73); and is organizer of a physical-geographical and archæological exploration of Central Asia under the auspices of the Carnegie Institute. He was professor of mineralogy at Harvard, 1866–73; State geologist of Michigan, 1869–71; director of the Missouri Geological Survey, 1871–73; chief of division of the United States Geological Survey, 1879–81 and 1884–91; and organized and directed the Northern Transcontinental Survey in 1881–84. He made the explorations which resulted in the inauguration of the iron-ore industry of Michigan and western Ontario. He is the author of *Geological Researches in China, Mongolia, and Japan* (1866); *Mineral Industries of the United States* (1886); etc. E.E.T.

PUMPKIN. See Gourd, Vol. XI, p. 5.

PUMPS. See Hydromechanics, Vol. XII, pp. 564–567; Air-pump, Vol. I, pp. 380, 381; Pneumatics, Vol. XIX, pp. 257–259; and Mining, Vol. XVI, pp. 479–480.

PUNA or DESPOBLADO. See Bolivia, Vol. IV, p. 12.

PUNCH AND JUDY. See Punchinello, Vol. XX, p. 112.

PUNIC WARS. See Rome, Vol. XX, pp. 765–770.

PUNK. See Touchwood, in these Supplements.

PUNTA ARENAS. See Patagonia, Vol. XVIII, p. 357; and Costa Rica, Vol. VI, 398–99.

PURACE. See Popayan, Vol. XIX, p. 496.

PURANAS. See Sanskrit, XXI, pp. 296, 297.

PURCELL, John Baptist, clergyman, was born in Ireland on Feb. 26, 1800, and came to America at the age of eighteen. He studied at Mount St. Mary's College, Emmittsburg, Md., and in France, and in 1826 was ordained a priest of the Roman Catholic Church in the church of Notre Dame, Paris. He became a professor in and president of Mount St. Mary's College, and greatly developed and strengthened that institution. In October, 1833, he was called from the college and consecrated as bishop of the diocese

of Cincinnati — which then embraced all of Ohio and Michigan. In 1847, at his request, the diocese of Cleveland was set off from it, and several others were afterward similarly formed. He did an enormous work for the extension of the church and for the creation of schools, asylums and other institutions. He founded the theological seminary of Mount St. Mary's of the West and built the fine cathedral in Cincinnati. It was not his fault but his misfortune, however, that the finances of the diocese were ill-directed, and when a crisis occurred in 1879, and some $4,000,000 in trust funds were lost, he was broken-hearted but blameless. He resigned his bishopric in 1880, and died on July 4, 1883. W.F.J.

PURDUE UNIVERSITY, an educational institution located at Lafayette, Indiana. It was established in 1869 by the legislature of Indiana, under the terms of the act of Congress of July 2, 1862, relating to the founding of colleges of agriculture and the mechanic arts by the states and territories; and was named in honor of John Purdue, who donated $150,000 and 100 acres of land to the state for the benefit of the institution. It is supported by the state and by the general government. There is also an endowment of $340,000, and other non-productive property, to the value of $900,000. It has 180 acres of land in its campus and farm, and 28 buildings. The university embraces schools of Mechanical Engineering; Civil Engineering; Electrical Engineering; Agriculture; Science; and Pharmacy. In 1904 there were 1,450 students. R.W.C.

PURINTON, Daniel Boardman, an American educator, author and composer; was born in Preston County, Virginia, February 15, 1850. He was educated at the State University of West Virginia, where he received the degree of M.A. in 1876, and became a member of the faculty. His chief work as an educator has been his development of Denison University, Granville, Ohio, and of Shepardson College for ladies, having been made president of both affiliated institutions in 1890. W.R.B.

PURITANS. See Independents, Vol. XII, pp. 761–767.

PURPLE MEDICK or LUCERNE. See Agriculture, Vol. I, p. 335.

PURPLE OF CASSIUS, a purple precipitate obtained by the action of stannous and stannic chlorides on gold chloride. So called because first described by Andreas Cassius of Leyden. Its composition varies according to the method of preparation, so that it contains from twenty to forty per cent of gold along with tin and oxygen. Though the dry powder is often brown or bluish, it gives to glass a beautiful ruby color, and to porcelain violet and red tints, and as the color is permanent, though expensive, it is extensively used in the manufacture of the finer grades of glass and porcelain.

PURPURA. See Mollusca, Vol. XVI, pp. 673, 676.

PURPURINE. Trioxyanthraquinone, a dye which occurs, probably as a glucoside, in madder-root. It is obtained by heating alizarine with manganese dioxide and sulphuric acid, and in other ways. It forms orange-colored crystals containing one molecule of water, and when anhydrous, is dark red, and melts at 253°. It dissolves in water with dark yellow, in alkalis with red color. With alum mordants it gives a fine scarlet color, more yellowish than alizarine, but as it is more expensive than isopurpurine, which gives nearly the same shade, it is not extensively used.

PURÚS, a river of South America; rises in the Gulf of Peru, and flows east-northeast across part of Bolivia into Brazil, and then enters the Amazon, about one hundred miles west-southwest of Manaos. It is a very crooked stream, with numerous side channels, and is very picturesque in parts. From source to mouth its length is about nineteen hundred miles, but in a direct line is only nine hundred miles. Steam-navigation opened in 1869. On its banks is a population of some fifty thousand, engaged in the india-rubber trade.

PUS. See Surgery, Vol. XXII, p. 717.

PUSHKIN. See Poushkin, Alexander, Vol. XIX, pp. 668–669.

PUT-IN-BAY, a village and summer resort on a small island of the Wine Island group, a part of Ottawa County, northwestern Ohio, situated on Lake Erie, 40 miles E. of Toledo. Numerous small islands close together constitute a resort where many people from Toledo, Sandusky, Cleveland and other points spend their summers. The United States ship *Michigan*, the oldest man-of-war in the American navy, and the only one on the lakes, is stationed here most of the time. Commodore Perry gained an important victory over the English near this place, Sept. 10, 1813. Pop. township (1900), 1,040; village, 317.

PUTNAM, Connecticut, a town and city of Windham County, on the Quinebaug River, and a junction of divisions of the New York, New Haven and Hartford railroad, 45 miles east by north of Hartford, and 60 miles southwest of Boston, Mass. It is a busy commercial and industrial center, and a pleasant summer resort in picturesque surroundings; it has fine public buildings and institutions, and its manufactures include woolens, cottons, silk, sheetings, foundry material, machinery, building materials, leather, shoes, lumber, boxes, wood ware and cutlery. Population, 1900, of city, 6,667. C.L.S.

PUTNAM, Frederic Ward, an American archæologist; born in Salem, Mass., April 16, 1839. He graduated at the Lawrence Scientific School, Harvard, in 1862. He has been connected with the Essex Institute, Salem, as curator of ornithology (1856), director of museum (1864), and vice-president (1871–94); with the Boston Society of Natural History, as curator of ichthyology (1859), vice-president (1880–87), and president (1888–89); is professor of American archæology and ethnology at Harvard; curator of the Peabody Museum; advisory curator in the department of anthropology, American Museum of Natural History, New York; chairman of the committee on anthropology at the University of

California; and superintendent of the East Indian Marine Society's Museum. E.E.T.

PUTNAM, George Palmer, publisher, was born at Brunswick, Maine, on February 7, 1814, and after a brief apprenticeship in a carpet house became clerk in a New York bookstore. In 1830 he compiled an *Index to Universal History*, and soon after started the *Booksellers' Advertiser*, the first journal of the book-publishing trade. From 1837 to 1847 he was junior member of the firm of Wiley & Putnam, and in 1848 he founded a house of his own, in New York, which still exists under the name of G. P. Putnam's Sons. It was his fortune to publish the works of Washington Irving and other distinguished writers, and his house soon won a foremost place in the trade. In 1853 he established *Putnam's Monthly*, which for years had the highest rank as a literary magazine. Mr. Putnam was one of the pioneers of copyright reform, one of the founders of the Metropolitan Museum of Art in New York, and the author of several European and other guide books of merit. He died in New York on December 20, 1872.

G. P. PUTNAM.

W.F.J.

PUTNAM, Israel, an American soldier; born in Salem, Mass., Jan. 7, 1718. He was the 11th of a family of 12 children, and as a boy was noted for his strength and bravery. He had little education. At his majority he removed to Pomfret, Conn., where he bought a farm, and here at the age of 25 he had the encounter with a wolf with which his name is so generally associated, and which was a terror to the neighborhood. Its lair in a small cave having been discovered, and dogs having failed to dislodge it, Putnam crawled into the narrow passage and shot it dead. In 1755 he was appointed a captain of militia and did service, under Sir William Johnson, against Crown Point. In 1757 he was commissioned major and received several injuries in saving the powder-magazine at Fort Edward from fire. In 1758 he escaped from an Indian band by running the falls of the Hudson in a bateau, and on another occasion, having been captured by Indians and tied to a tree for roasting, his life was saved through the intervention of a French officer. In 1759 he was raised to lieutenant-colonel and served under Gen. Amherst, and in 1762, commanding a Connecticut regiment, took part in the Havana expedition. In 1764, now colonel, he accompanied Col. Bradstreet to Detroit in the Pontiac war. Afterward he kept a tavern at Brooklyn, Windham County, Conn., and frequently represented that town in the legislature. In 1773 he took part in an exploring expedition on the Mississippi. On the report of the battle of Lexington he left his plough in the furrow and rode the 68 miles to Boston in one day. He then went to Hartford and was elected brigadier-general by the legislature. He organized a regiment and led it to Cambridge, where he was sought out by British officers and offered a major-generalship, which he refused. He distinguished himself at Bunker Hill, and in July, 1775, was commissioned major-general by Congress. He participated in the battle of Long Island, Aug. 27, 1776, and thence proceeded to fortify Philadelphia. Later he commanded in the Highlands of the Hudson, but was removed after the loss of Forts Clinton and Montgomery. In 1779 he commanded in Connecticut and later again in the Highlands, where he completed the fortification of West Point. He died in Brooklyn, Conn., May 19, 1790.

E.E.T.

PUTNAM, Mary Lowell, author, sister of James Russell Lowell, was born in Boston on December 3, 1810, and in 1832 was married to Samuel R. Putnam, a Boston merchant. She translated some works from the Swedish, and wrote many magazine articles. Among her books are a *History of the Constitution of Hungary*, *Records of an Obscure Man*, *The Tragedy of Errors*, and *The Tragedy of Success*, the last two named being dramatic poems, dealing with the subject of human slavery. She died in Boston in 1898. W.F.J.

PUTNAM, Rufus, an American pioneer; born in Sutton, Mass., April 9, 1738. He served in the army until 1760, when he engaged in farming and millwrighting; went on an exploring expedition in Florida in 1773; entered the Continental army, 1775, and rose to the rank of colonel. In 1778 he superintended the fortification of West Point, and in January, 1783, was made brigadier-general. In 1786 he was instrumental in the formation of the Ohio Company, which purchased a large tract of land at the confluence of the Muskingum and the Ohio, and in 1788 he laid out the site of Marietta, Ohio. In 1790 he was appointed judge of the Territory Northwest of the Ohio, and in 1796 became surveyor-general of the United States lands. He died in Marietta, May 1, 1824. E.E.T.

PUVIS DE CHAVANNES, Pierre, painter; was born at Lyons, France, on December 14, 1824, and was a pupil of Henri Scheffer and Theodore Couture. At an early age he devoted himself chiefly to mural and decorative painting, and in that department of art ranked among the foremost masters of his time. He frequently exhibited at the Salon huge works intended for the decoration of public buildings. Among them were *The Return from the Chase* (1859); *Peace*, and *War* (1861); *Toil* and *Repose* (1863); *Autumn* (1864), etc. Many of his works are in churches, public museums, the Hotel de Ville, Paris, and similar places. In 1890 he was one of the leaders of the Society of Artists, which was formed to oppose the Salon in the universal exposition of the Champs de Mars, and, upon the death of Meissonier, became its president. He sent to that exposition a number of notable works, in-

cluding *Between Art and Nature; Ceramic Art; Summer; Winter*, and *The Homage of Paris to Victor Hugo*. He received a second-class medal in 1861, a medal in 1864, a third-class medal at the world's fair of 1867, and the medal of honor at the Salon of 1882. He received the cross of the Legion of Honor in 1882, and was made a commander of it in 1889. His works are characterized by grandeur of conception and marked sobriety of color, and command the highest approval of fine arts connoisseurs. He died on October 25, 1898. W.F.J.

PYÆMIA. See SURGERY, Vol. XXII, p. 712.

PYCNOGONIDA. See ARACHNIDA, Vol. II, pp. 242, 243.

PYGOPODES. See ORNITHOLOGY, Vol. XVIII, p. 49.

PYLE, HOWARD, author and artist, was born at Wilmington, Delaware, on March 5, 1853, and studied art in Philadelphia. In 1876 he settled in New York as an artist, devoting himself chiefly to illustrating books and periodicals. Much of his work has been done for the publications of Harper & Brothers. He has also essayed authorship with success, and has written *Within the Capes*, *Pepper and Salt*, *Otto of the Silver Hand*, *Buccaneers and Marooners of America*, *Jack Ballister's Fortunes*, *The Merrie Adventures of Robin Hood*, *The Rose of Paradise*, *The Wonder Clock*, *Men of Iron*, and *The Garden Behind the Moon*. W.F.J.

PYNCHON, THOMAS RUGGLES, an American clergyman and educator; born in New Haven, Conn., Jan. 14, 1823. He graduated at Trinity College, Hartford, in 1841, and was classical tutor and lecturer on chemistry, 1843–47; Scoville professor of chemistry and natural sciences, 1854–77; professor of moral philosophy, 1877–1902 (now professor emeritus), and president, 1874–83. In this latter capacity he engaged actively in alterations of site and buildings. He was ordained deacon in the Protestant Episcopal Church in 1848; was ordained priest in 1849; and was rector of the churches at Stockbridge and Lenox, Mass., 1849–54. He has been a close student of geology, especially with reference to volcanic action. E.E.T.

PYNCHON, WILLIAM, colonist and author, was born in England about 1590, and came to America with Winthrop. He settled in Massachusetts, and founded the city of Springfield, which he named for his native place in England. He was the author of several books, controverting the Calvinistic doctrines of the Atonement and of Sabbath observance. For these he was denounced as a heretic, and he thereupon returned to England to avoid persecution. He died in England on October 29, 1662. W.F.J.

PYOGENIC COCCI. See SURGERY, AMERICAN, in these Supplements.

PYRENE, a compound of carbon and hydrogen, having the formula $C^{16}H^{10}$, found in coal-tar Its constitution is undetermined.

PYRENOMYCETES. See FUNGUS, Vol. IX, p. 733.

PYRHELIOMETER. See THERMOMETER, Vol. XXIII, pp. 311, 312.

PYRIDINE, C^5H^5N, a tertiary base which occurs in fusel-oil and in Dippel's animal-oil, and may be made synthetically in a number of ways. It is a strong-smelling liquid, boils at 116°, forms salts with acids and double salts like ammonia, and also a large number of derivatives. In some Continental countries it and its homologues are added to alcohol used in the arts, and therefore duty free, to render it unfit for drinking.

PYROACETIC SPIRIT, an old name for acetone, which is found in the distillate from wood and is used in making chloroform.

PYROGALLOL, TRIOXYBENZOL OR PYROGALLIC ACID, a phenol obtained by the dry-distillation of gallic acid and in other ways, in thin plates or needles, bitter, poisonous, soluble in water, alcohol and ether, melting at 115° and boiling at 210°. It is an energetic reducing agent, and is used in gas-analysis and photography, in medicine as an ointment, in psoriasis, and with silver nitrate as a hair-dye.

PYROLA, a genus of evergreen herbs belonging to the family *Ericaceæ*, or heaths. The white or greenish-white flowers are borne in a raceme on a scape which bears rounded leaves at base, and usually grow in rich woods. The popular names are wintergreen and shin-leaf.

PYROLIGNEOUS ACID. See TAR, Vol. XXIII, p. 62.

PYROPE. See GARNET, Vol. X, p. 74.

PYROPHORUS, any substance which takes fire on exposure to air. Many metals, such as iron, nickel, etc., in a finely divided state, as obtained by reduction of an oxide at low temperature, are pyrophoric.

PYRO-PHOSPHORIC ACID. See CHEMISTRY, Vol. V, pp. 449–450.

PYROXYLIC SPIRIT. See METHYL ALCOHOL, in these Supplements.

PYROXYLIN. See GUN-COTTON, Vol. XI, p. 245.

PYRRHA. See DEUCALION, Vol. VII, p. 116.

PYRRHO OF ELIS. See SCEPTICISM, Vol. XXI, p. 396.

PYRUS. See ARBORICULTURE, Vol. II, p. 281.

PYRUS OR PIRUS, the genus of *Rosaceæ*, to which belong the apple (*P. Malus*) and pear (*P. communis*). The flowers are well known, and while in the ordinary forms cultivated for fruit have simple leaves, the group of rowan-trees or mountain-ashes have pinnate leaves and are often planted for ornament.

PYTHIA. See ORACLE, Vol. XVII, p. 832.

PYTHIAN GAMES. See GAMES, Vol. X, p. 59.

PYTHIAS. See DAMON, Vol. VI, p. 700.

PYX, TRIAL OF THE. See MINT, Vol. XVI, p. 506.

Q

QUA-BIRD—QUARRYING MACHINERY

QUA-BIRD OR NIGHT-HERON. See HERON, Vol. XI, p. 681.

QUACKENBOS, GEORGE PAYN, an American educator; born in New York, Sept. 4, 1826. He graduated at Columbia College in 1843, and began teaching in North Carolina. In 1847 he opened a private school in New York, and was principal of the Collegiate School, New York, from 1857 to 1866. At various times he was connected with journalism as contributor or correspondent, and was editor of the *Literary American*, 1848–50. He published, among other works, *Advanced Course of Composition and Rhetoric* (1854); *Illustrated School History of the United States* (1857); and edited *Spiers and Surenne's French Dictionary*, *Bain's Rhetoric*, and *Lockyer's Astronomy*. He died in New London, N. H., July 24, 1881. E.E.T.

QUADRAGESIMA. See LENT, Vol. XIV, p. 447.

QUADRANT. See NAVIGATION, Vol. XVII, pp. 264, 265.

QUADRATIC EQUATION. See ALGEBRA, Vol. I, p. 474.

QUADRATURE OF THE CIRCLE. See SQUARING OF THE CIRCLE, Vol. XXII, p. 450.

QUADRUMANA. See MAMMALIA, Vol. XV, p. 451.

QUADRUPLEX. See TELEGRAPH, Vol. XXIII, p. 133.

QUAIN, SIR RICHARD, a British physician; born in Mallow, Ireland, Oct. 30, 1816; graduated in medicine at the University of London in 1842, receiving a gold medal and a certificate of special proficiency. In 1846 he became a member of the Royal College of Physicians of London, and in 1871 a fellow of the Royal Society. He was also fellow and vice-president of the Royal Medico-Chirurgical and Medical societies of London, and president of the Pathological and Harveian societies. In 1885 he was made physician extraordinary to the Queen; in 1889 received the degree of LL.D. from Edinburgh; and in 1891 was created baronet and elected president of the General Medical Council. In 1882 he edited *A Dictionary of Medicine*, which had a large sale in Great Britain and other countries. He contributed largely to the *Transactions* of learned societies and medical journals. Died in London, March 13, 1898.

QUAKERS. See QUAKERS, Vol. XX, pp. 892–893; and FRIENDS, SOCIETY OF, in these Supplements.

QUAKERTOWN, a borough in Lawrence County, southeastern Pennsylvania, 18 miles S. of Bethlehem, on the Philadelphia and Reading railroad. It contains many manufactories of stoves, musical instruments, agricultural implements, boots and shoes, cigars, carriages and wagons. Population 1890, 2,169; 1900, 3,014.

QUAKING-GRASS, a popular name given to species of the genus *Briza*, notably to *B. maxima*, a European fern sometimes cultivated for ornament. It is a low grass, with broad leaves and drooping, heart-shaped spikelets, which are swollen and purplish, and becoming dry and papery, rattling in the wind, hence often called, also, rattlesnake-grass.

QUANAH, a town and the capital of Hardeman County, northern Texas, on the Fort Worth and Denver City railroad, 175 miles N.W. of Fort Worth. It is in an agricultural and stock-raising district, and has a bank. Population 1890, 1,477; 1900, 1,651.

QUANTITY OR QUANTICS, in mathematics. See MEASUREMENT, Vol. XV, p. 637.

QUARRYING MACHINERY. The channeling process marks the most important improvement in quarrying within recent years. Machines cut straight channels in the rock, so that it is gotten out in large blocks, the side of the quarry being cut in successive steps or shelves, each perhaps six feet in height. Two types of channeling-machine are used, the track-channeler and the bar-channeler. The Wardwell, Sullivan, and Bryant machines are of the first type, and quite similar. The Bryant machine has an upright boiler and engine mounted on a four-wheeled car, and carrying an upright reciprocating drilling mechanism operating a gang of cutters. It has two cushioned arms or levers working on a common fulcrum, so that the drills may be fed down, and the levers dropped without compression of the rubbers. The frame is made of steel I beams, with malleable iron brackets riveted together. By means of friction-clutches the machine can be held on a track with a grade of one to ten.

The diamond channeling-machine differs from other track-channelers in having a toothed rail This is done in order to move the machine a set distance after cutting each hole. The holes are drilled on the line with diamond bits.

Saunders' track-channeler for side-hill work is a light machine with a drilling mechanism adjustable to any convenient incline. There is no boiler and engine on the car, the power being supplied through a pipe. The chisels are mounted in a gang fast to the piston, so that the blow is delivered directly. On the up-stroke of the piston the car is fed along, and as a result it chips out the channel, instead of powdering it, as do most machines.

The bar-channeler has two heavy tubular bars mounted horizontally on adjustable weighted legs, and bearing on a traveling-saddle a drill with a gang of cutters. It may be used for either horizontal or vertical cutting, and may be

operated either as an ordinary rock-drill or as a channeler.

The cutters used in channeling are a gang of chisel-shaped bits, variously formed according to the nature of the work. A three-drill gang is used for sandstone, and five-drill gangs for harder cutting. A channeler will cut from 150 to 400 square feet of sandstone or limestone in ten hours, and from 75 to 125 feet of marble in the same time.

The gadder or quarry-bar is a rock-drill mounted on a single and usually horizontal bar. When mounted on wheels it is called a gadding-car or gadding-machine. It is used to drill holes in a straight line, and especially in plug-and-feather work. The holes are formed specially for this work, resembling a circle with two V extensions in the direction in which the rock is to split. These holes being drilled vertically and horizontally all about the block which is to be removed, the feathers are inserted the full depth of the holes. Then the plugs are driven in to spread the feathers, and the rock is split along the line of holes.

The latest form of powder-magazine for quarrymen's use has a stone foundation at least two feet high, to guard it from light burnable material, such as leaves that may accumulate at its base. The sides are built very strongly of six-inch timbers, which are bullet-proof, and calculated to preserve the powder from accidents caused by stray sportsmen or stone-throwing boys. The roof is built rather lightly of corrugated iron, so that in case of explosion the drive will be upward, where it can do the least harm. Thawing-houses for dynamite are built very low, and covered and surrounded with broken rock. Bomb-proof shelters are constructed somewhat similarly of strong timbers, the roofs being heaped over with rocks.

Blasting is now done preferably by electricity. The electric fuses are made with a copper shell or cup, about an inch and a quarter in length, and a quarter of an inch in diameter. Copper wires are inserted at the open end, and imbedded in an explosive fulminate that fills two thirds of the shell. The top of the shell is closed by a plug of melted sulphur. The wires are insulated from each other to prevent a current of electricity passing through the fulminate. This fuse is imbedded in the end of a stick of dynamite, and tied to it with twine. A little magneto-machine in a portable case supplies the electricity for the discharge. The wires are connected at its top by binding-screws, and the pushing of a handle does the rest. A row of holes are connected and exploded at one blast.

Engines, boilers, air-compressors, rock-drills, screens, etc., are used commonly in quarrying, but do not require description here. Rock-breakers and conveyors, however, are built in special forms for the quarryman's use. A preferred form of breaker has a stout, upright column bearing at its top a corrugated inverted steel cone, which is made to rotate within a case so shaped that the large stones may enter at the top and be crowded down by gravity against the corrugations, which break the stone until it is small enough to fall through the openings at the base of the cone. Then the broken stone is carried off down an inclined plane. Power is received from a horizontal shaft through bevel-gears. At the foot of the breaker is usually arranged a conveyor of iron buckets mounted on an endless chain, so that the stone can be carried up to the screens, or delivered into cars or wagons by chutes. Small breakers are sometimes mounted on heavy portable trucks, carrying a conveyor at one end. Where the amount of broken stone handled is large, pockets are built, similar to coal-pockets, being stout compartments with space underneath for cars or wagons. From these pockets the stone is let out in chutes as desired.

For hoisting large blocks from the quarry, wire ropeways are common. The tackle includes a combined hoist and traveler, so that the blocks may be raised and then run along the wire to the ground above.

Hydraulic washing is a process recently introduced into the quarrying industry. A powerful steam-pump, and nozzles of five or six inches diameter, similar to those used in hydraulic mining, are used to throw streams of water against a bank, removing the loose dirt and leaving the large stones clear for easy working.

C. H. COCHRANE.

QUARTERMASTER-GENERAL, a staff-officer of the army, with rank of brigadier-general, who is at the head of the quartermaster's department. It is his duty to provide quarters, provisions, and ammunition for the troops, and to furnish means of transportation for troops and the munitions of war. In the British army, he is a staff-officer with rank of major-general or colonel, whose duty it is to prescribe marching routes, execute military surveys, and prepare means for defence, as well as to regulate the transportation of troops and provide quarters for them. R.W.C.

QUARTLEY, ARTHUR, artist, was born in France on May 24, 1839, of English parents, and was taken to England at the age of two years, where he studied art. In 1851 he came to America and became a sign-painter in New York and Baltimore. In 1873 he opened a studio in Baltimore, which he removed to New York in 1875, and devoted himself thereafter to painting landscapes, marine views, and genre works, his highest rank being attained in marine views. He was elected an associate of the National Academy in 1879 and an Academician in 1886. He painted a number of striking views of the harbor and bay of New York, and scenes along the docks. Among his best pictures are *Low Tide*, *Morning on the North River*, *Port of New York*, *Dignity and Impudence*, *The Coast of Cornwall*, *Close of a Stormy Day*, and *From a North River Pier Head*. He died in New York on May 19, 1886.

W.F.J.

QUASS, a liquor. See LARCH, Vol. XIV, p. 311.

QUATERNARY ERA. See GEOLOGY, Vol. X, pp. 324–329.

QUATRE-BRAS, BATTLE OF. See NAPOLEON, Vol. XVII, p. 230.

QUATREFAGES DE BRÉAU, JEAN LOUIS ARMAND DE, a French anthropologist; born in Berthezème (Gard), Feb. 10, 1810; studied at Strasburg, where he took the degree of M.D., and began to write on subjects of natural philosophy as early as 1829. In 1838 he was called to the chair of zoölogy at Toulouse, but soon resigned and went to Paris. He was elected professor of natural history in the Lycée Napoléon in 1850, and a member of the Academy of Sciences in 1852; was nominated a chevalier of the Legion of Honor in 1845; called to the chair of anthropology and ethnology in the Museum of Natural History at Paris in 1855; promoted grand officer of the Legion of Honor in 1863, and elected president of the French Geographical Society in 1889. His chief works are *Souvenirs d'un Naturaliste* (1854); *Métamorphose de l'Homme et des Animaux* (1862); *Histoire de l'Homme* (1869); *La Race Prussienne* (1879); *Hommes Fossiles et Hommes Sauvages* (1884); *Histoire Générale des Races Humaines* (2 vols., 1886, 1889). He died Jan. 12, 1892.

QUAY, MATTHEW STANLEY, an American politician; born in Dillsburg, Pa., Sept. 30, 1833. He graduated at Jefferson College, Pa., in 1850. From 1861 to 1865 he was lieutenant in the 10th Pennsylvania Reserves; colonel of the 134th Pennsylvania Volunteers; lieutenant-colonel and assistant commissary-general; military State agent at Washington; private secretary to the governor of Pennsylvania; major and chief of transportation and telegraphs; and military secretary to the governor. He was a member of the legislature, 1865–67; secretary of the Commonwealth, 1872–78, and again 1879–82; a delegate to the Republican national conventions of 1872, 1876, 1880, and 1892; a member of the Republican national committee, 1885–1904, and its chairman in 1888. He was United States senator from March 4 1887, to March 3, 1899, when a deadlock in the legislature prevented his re-election. He was tried for misappropriation of public funds, and was acquitted April 21, 1899; the same day was appointed United States senator *ad interim;* and was elected to the same office in January, 1901, serving till his death, which occurred in Beaver, Pa., May 28, 1904. E.E.T.

M. S. QUAY.

QUEBEC. The province of Quebec, formerly Lower Canada, and for 150 years the seat of French dominion in the New World. (See QUEBEC, Vol. XX, pp. 174–76.) Much of the country is heavily wooded, the hilly ranges—the Laurentides and the Eastern Alleghanies—being clothed with dense forests of conifers and hardwoods, while the valleys abound in cedar, spruce and pine. The scenery is bolder and more picturesque than that of its sister province to the west; and the tourist finds a great source of attraction in the two historic French-speaking cities, Montreal and Quebec, and in the quaint manners and customs of the still mediæval peasant. Besides the cities and towns of the province, there are five distinct centers of colonization, each with large areas for homesteading. These are: 1. The Eastern townships, now French though originally settled by the British, lying between Montreal and the Maine boundary; 2. The valley of the Ottawa; 3. The valley of the St. Maurice; 4. The valley of the Saguenay and the region of Lake St. John; and 5. The Gaspé district, between New Brunswick and the Gulf of the St. Lawrence.

Quebec is rich in minerals of much economic value, though the mines as yet are undeveloped practically. There is the best of building-material in the large quarries of gray and white granite, of which the public buildings of Montreal are constructed; there is also much limestone, slate-stone, plumbago, mica, phosphates, asbestos, and rich veins of copper, nickel and iron-ore. There are also considerable traces of gold, particularly in Beauce County, near the frontiers of the province, and south of Quebec. Another large source of provincial wealth is lumber, which is exported heavily, though not now in square timber, the trade in which used to be monopolized by the city of Quebec and caused its wharves to be thronged with shipping. That halcyon era has passed for the ancient capital, and with it has gone the ship-building industry. What trade there is in lumber has betaken itself, in the main, to Sorel, Three Rivers and Montreal. The fish industries of the province continue to flourish, and there is still a considerable export of furs. At Quebec city tobacco is manufactured largely now, and there are flourishing factories of boots and shoes. Agriculture is a chief occupation of the people, but the export of farm produce is limited, owing to the small holdings of the *habitans* and their primitive methods of farming. Quebec is the one province in the Dominion in which the tobacco-plant is cultivated to any extent. The yield for 1891 was close upon four million pounds.

Montreal, the largest city in the Dominion and the head of ocean navigation, is the chief center of Canadian commerce, and the principal summer shipping-port of Canada. It is the great distributing-point, via the railways and canals, for the entire country, and it has a large and fast-expanding commerce, somewhat handicapped, however, by French inertia. Here are large sugar-refineries, cotton-mills, tobacco factories and other progressive industries which have the benefit of cheap labor. The population of Montreal in 1901 was 267,730; that of Quebec City was 68,840; the population of the province in 1901 was 1,648,898, of which only about 400,000 are English-speaking. The commerce of the province has the facilities of fourteen local banks, with an aggregate capital of close upon $35,000,000, and total assets of $162,000,000. The two chief institutions are the Bank of Montreal, with

a capital of $12,000,000, and the Merchants' Bank of Canada, with a capital of $6,000,000.

The province is governed under a lieutenant-governor, by an executive council of nine members (two of them without portfolios), responsible to the legislative assembly, which has now 73 members, the number of members having increased in 1900 from 65 members. There is also a legislative council of 24 members. To the Dominion Parliament the province sends 65 representatives, and its quota of senators is 24. The net annual revenue in June, 1900, was $4,451,578, and the year's expenditure was $4,433,386. The province has a large debt, amounting in 1900 to $36,120,393, with assets of only $13,888,538. The debt has doubled since 1885.

The large increase in the provincial debt has come about, in the main, in consequence of the freedom with which the French province has been allowed to deal with its finances, the burden of which must fall heavily upon the British commercial community, the chief taxpayers, who, being in the minority, have little power to check or restrain the expenditure.

The chief religious denomination in the Quebec province is the Roman Catholic, of whom, in 1891, there were 1,291,709. The Church of England had a membership of 75,472; the Presbyterians, 52,659; the Methodists, 39,416; the Baptists, 7,981; the Congregationalists, 4,296. Education in the province is directed by a superintendent of public instruction, under a council of 35 members, who form committees for the management of the Roman Catholic and Protestant schools. The schools are maintained chiefly by local taxation, aided by an annual grant from the government of about $309,300. They are controlled by local boards. The number of Roman Catholic schools in the province is 4,980; of Protestant, 966. The average attendance in all is 241,178; the total enrolled, 322,761. There are 2,215 male and 8,640 female teachers. The teachers in religious orders number 3,958. The total number of schools was, in 1900, 5,959.

QUEBEC, a city. See Vol. XX, pp. 174–176.

QUEBRACHO-WOOD. See LEATHER, Vol. XIV, p. 382.

QUEEN'S BENCH, COURT OF. Same as KING'S BENCH. See BENCH, Vol. III, p. 480; and RECORDS, Vol. XX, p. 324.

QUEENSLAND, a British Australian colony. The latest reports place the area of Queensland at 668,497 English square miles, with a sea-coast of 2,250 miles. The population in 1900 was 498,549. In the exercise of authority the governor is assisted by an executive council of 9 members. The Parliament has two houses—the Legislative Council of 41 members, and the Legislative Assembly of 72 members. The electoral districts are 61. The number belonging to the various religious denominations was in 1901 as follows: Church of England, 185,023; Church of Rome, 120,663; Presbyterian, 57,615; Wesleyan, 29,791; Lutheran, 25,505; Baptist, 12,252; other sects, 72,417. Education is compulsory. The number of public elementary schools in 1900 was 932, with 2,217 teachers and an average daily attendance of 69,285 pupils. There were also 163 private schools, with 588 teachers and an average attendance of 11,619. The public expenditure for education was (1900) $1,393,290. The revenues of Queensland for the year ending June 30, 1901, were $21,636,725, and the expenditures $24,277,665. The estimated revenue for 1901–02 was $19,542,500, and estimated expenditure $19,439,500. For the defense of the colony there is a drilled force of about 4,000 men, 2,500 militia and several gunvessels ranging from 250 to 450 tons. The live-stock in 1900 numbered 456,788 horses, 4,078,191 cattle, 10,339,185 sheep and 122,187 pigs. The total area under cultivation was 480,372 acres. There were raised 2,684,925 bushels of corn, 545,185 bushels of wheat, and the sugar-cane yielded 91,712 tons of sugar. The amount of coal mined (1900) was 497,132 tons; of gold, 963,189 ounces; of silver, 112,990 ounces; of tin, 1,123 tons; of copper, 384 tons; of lead, 205 tons. The total value of imports in 1900 was $35,920,560, and of exports $47,907,810. The shipping in 1900 consisted of 248 vessels, of an aggregate of 21,083 tons. At the close of 1900 there were 2,801 miles of railways, earning $6,564,280, and expenses $5,174,400. The same year there were 1,277 post-offices, with a revenue of $1,574,200, and 19,308 miles of telegraph, with 472 stations. The number of banks in 1900 was 11, with a circulation of $1,944,165. The savings banks had, on Jan. 1, 1901, 80,900 depositors, with $18,811,030 to their credit.

The question of Australasian Federation has become a realized fact in the government of Queensland. See AUSTRALIAN FEDERATION, in these Supplements. For a general geographical and historical description, see QUEENSLAND, Vol. XX, pp. 177–182.

QUEEN'S UNIVERSITY (Kingston, Ontario, Canada), founded in 1841 in the interest of the Presbyterian Church in Canada, in connection with the Church of Scotland. The early development of Queen's was greatly hindered by the separation which took place in the Presbyterian Church in Canada consequent on the disruption of 1844 in Scotland. An improvement in the position of Queen's, however, took place on the reunion of the Presbyterian bodies in Canada in 1874, and as the result of the more effective organization conferred on it by an act of the Ontario legislature of that year. It is now a flourishing institution, having a well-equipped teaching-staff in arts, science and theology, with a medical college in affiliation. Its later career owes much to the enthusiasm of its principal, Dr. George M. Grant.

QUELPAERT. See COREA, Vol. VI, p. 347.

QUERCIA, JACOPO DELLA, sculptor; born near Sienna, Italy, in 1378. His genius was manifested at the age of nineteen in a well-wrought equestrian statue in wood. Two groups in marble in the Cathedral of Sienna rank him among the first artists of his period. In Florence he decorated one of the doors of the cathedral with some noble bas-reliefs, sculptured the ornaments of the doorway of San Petronio at Bologna, and co-operated with Ghiberti in restoring the Sienna cathedral. He died in 1442. G.J.H.

QUERÈTARO, a state of Mexico, inclosed on

the west by Guanajuato and on the east by Hidalgo, in the central southern portion of the country. Its area is 3,556 square miles. It lies entirely in the region of the high plateau, but the surface is mountainous, especially in the northern part; the valleys are fertile, and the higher slopes are covered with pine and oak forests; the climate resembles that of southern California. Its products are maize and cotton, with grain and fruits, and it has mines of silver, lead, copper and iron, with manufactures of woolen cloth, soap, pottery and iron-wares. The capital of the state is Querétaro (q.v., Vol. XX, p. 182), with a population in 1895 of 34,576. Population of the state in 1895, 228,551.

QUESADA, GONZALO DE, diplomatist; born in Havana, Cuba, Dec. 15, 1868. He was brought to the United States by his parents in 1876; was graduated at the College of the City of New York in 1888, and studied law at the University of the City of New York, from which he received the degree of LL.B. in 1891. Later he became secretary to Roque Saenz Peña, minister of foreign affairs for the Argentine Republic, and traveled with this official through England, France, and Spain. He also accompanied him to the Pan-American Congress, held in Washington, D. C. He then went to Philadelphia as consul of the Argentine Republic. He resigned this post to become secretary to the Cuban revolutionary party in the United States. In 1898 he was appointed *chargé d'affaires* of the Republic of Cuba in Washington. Two years later he was special commissioner for Cuba to the United States, and in 1901 was a delegate to the constitutional convention of the young republic, and a member of the committee to frame its constitution. In 1902 he was a member of the Cuban Congress, and in the same year was appointed minister to the United States. He wrote *History of Free Cuba*, etc. G.J.H.

QUICHE INDIANS. See YUCATAN, Vol. XXIV, p. 798.

QUICHUA INDIANS. See PERU, Vol. XVIII, p. 689.

QUICKSILVER. See MERCURY, Vol. XVI, 36.

QUILLER-COUCH, ARTHUR T., an English novelist, whose stories appear usually over the initial "Q.," was born at Polperro, Cornwall, Nov. 21, 1863. He was educated in Devonshire and at Clifton College, after which he passed to Trinity College, Oxford, where he graduated a first-class in classics. While at college he contributed to the Oxford *Magazine*, and for a time was classical lecturer at Trinity. He afterward proceeded to London, and was launched on a literary career. With J. M. Barrie, he became a member of the staff of *The Speaker*, in which literary weekly many of his stories and literary criticisms first appeared. His principal publications are *Dead Man's Rock* (1887); *The Astonishing History of Troy Town* (1888); *The Splendid Spur* (1889); *The Warwickshire Avon* (1891); *The Blue Pavilions* (1891); *Noughts and Crosses* (1892); *I Saw Three Ships* (1892); *The Delectable Duchy* (1893); *Green Bays: Verses and Parodies* (1893); *The Golden Pomp: A Procession of English Lyrics from Surrey to Shirley* (1895); *Ia: A Love Story* (1895); *Wandering Heath* (1896); and a series of cleverly-written criticisms, entitled *Adventures in Criticism* (1896).

A. T. QUILLER-COUCH.

QUILLWORTS, the common name of species of the genus *Isoëtes*, a small group of Pteridophytes. They are grass-like plants, with narrow leaves growing in a cluster from short, tuber-like stems, and grow in water or muddy places. The spore-cases are borne upon the leaf-bases within, and are of two kinds, producing large spores (*macrospores*) and small spores (*microspores*). See HETEROSPORY, in these Supplements.

QUILLS. See FEATHERS, Vol. IX, p. 53.

QUILOA OR KILWA. See ZANZIBAR, Vol. XXIV, p. 807; and KILWA, in these Supplements.

QUINCY, a city and the capital of Adams County, Illinois, on the Chicago, Burlington and Quincy, the Hannibal and St. Joseph, the Quincy, Omaha and Kansas City, the St. Louis, Keokuk and North-Western and the Wabash railroads. It has 80 miles of improved streets, 4 public parks, 2 opera-houses, 2 state armories, 2 hospitals, 2 orphan asylums, 9 public schools, 13 parochial schools and a medical and a literary college. Quincy has a very well-organized fire department, and among its finest buildings are the State Soldiers' and Sailors' Home, which has a very fine library, the United States Government Building and the courthouse, surrounded by a handsome park. Its industries in 1900 (421 in number) with a combined capital of $6,879,846, comprise a pork-packing establishment, several stove foundries and machine-shops, carriage and wagon factories, brickyards, cigar and chewing-tobacco factories, flour-mills, cooper-shops, breweries, saddle and harness factories, lime-works, organ factories, paper-mill, furniture factories and steam-governor works; it has also a large public library. Chaddock College (Methodist Episcopal) organized in 1853 and located here, is a co-educational institution, and in 1899 had 14 instructors and 83 students. Pop. 1900, 36,252. See also QUINCY, Vol. XX, p. 189.

QUINCY, a town and seaport in Norfolk County, Massachusetts. Population 1890, 16,723; 1900, 23,899. See QUINCY, Vol. XX, p. 189.

QUINCY, a village of southern Michigan, on the Lake Shore and Michigan Southern railroad, 31 miles S.W. of Jackson. It has two sawmills and manufactories of staves, headings, sash and doors. Population 1890, 1,250; 1900, 1,563.

QUINCY FAMILY, an eminent Massachusetts family, transplanted thither from England in early colonial times and remotely of Norman origin. Two of its best known members, Josiah Quincy and Josiah Quincy, Jr., are dealt with elsewhere in this encyclopædia (see Vol. XX, page 189). Some others may here be briefly mentioned.

QUINCY, EDMUND, colonist, was born in Massachusetts about 1681, and was graduated from Harvard College in 1699. He was a judge and member of the colonial council, and was engaged in the boundary dispute between Massachusetts and New Hampshire. He died in London in 1738.

QUINCY, EDMUND, son of Edmund Quincy, was born in Massachusetts in 1703, was graduated from Harvard College in 1722, was the father-in-law of John Hancock, and died in 1788.

QUINCY, EDMUND, son of Josiah Quincy, was born in Boston on February 1, 1808, was graduated from Harvard College in 1827, wrote a charming novel called *Wensley*, was a prominent abolitionist, and died on May 17, 1877.

QUINCY, JOSIAH, municipal administrator, son of President Josiah Quincy of Harvard College, was born in Boston on January 17, 1802, and was graduated from Harvard in 1821. He became a lawyer, was president of the Boston city council 1834–37, and of the State Senate in 1842. As mayor of Boston in 1845–49 he introduced the Cochituate water system. He died on November 2, 1882. W.F.J.

QUINISEXT COUNCIL. See CANON LAW, Vol. V, p. 16.

QUINOA, the native name of *Chenopodium quinoa*, one of the goosefoots of Central America, and cultivated for its nutritious seeds.

QUINSY. See THROAT DISEASES, Vol. XXIII, p. 341.

QUINTARD, CHARLES TODD, physician and clergyman, was born at Stamford, Conn., on December 22, 1824, and was graduated from the medical college of New York University in 1847. He practiced his profession in Georgia, became professor of physiology and pathology in the Memphis, Tenn., medical college, and was an editor of the *Medical Recorder*. In 1855 he became a minister of the Protestant Episcopal Church, and was a chaplain in the army in the Civil War. In September, 1865, he was elected bishop of the diocese of Tennessee. He reorganized the University of the South and was its first vice-chancellor. He died on February 15, 1898. W.F.J.

QUIRINAL, one of the seven hills of Rome, and the palace. See ROME, Vol. XX, pp. 750–857.

QUIRITES. See ROMAN LAW, Vol. XX, p. 686.

QUITCLAIM, a form of release by deed in use in the United States. The character of this deed is similar to that of the release in English law. See RELEASE, in these Supplements.

QUITMAN, a village and the capital of Brooks County, southern Georgia, 14 miles E. of Valdosta, on the Savannah, Florida and Western railroad, and on the Ocopilco River. It has an academy, six churches and three newspapers. Population 1890, 1,868; 1900, 2,281.

QUITMAN, JOHN ANTHONY, an American politician and soldier; born in Rhinebeck, N. Y., Sept. 1, 1799. He became a tutor at Hartwick Academy, Cooperstown, N. Y., in 1815; professor of English literature at Mt. Airy College, Germantown, Pa., in 1817; and began the study of law at Chillicothe, Ohio, in 1818. Later he removed to Delaware, Ohio, where he was admitted to the bar. In 1821 he settled in Natchez, Miss., and practised his profession. He was a member of the State House of Representatives in 1827, and State chancellor from 1828 to 1834, when he was elected to the State Senate and was chosen its president. He filled a temporary vacancy in the governorship in 1836, but soon afterward led a small body of men to the assistance of the Texans, then struggling for independence. He then resigned his practice in Natchez, and held various local positions of honor till 1846, when he was appointed brigadier-general, U. S. A., and ordered to Mexico. He distinguished himself at Monterey, Vera Cruz, Pueblo, Chapultepec, and the city of Mexico, and was brevetted major-general for gallantry and received a sword from Congress. He was next elected governor of Mississippi, but, owing to a conflict with the federal government in regard to an alleged Cuban filibustering expedition, resigned the office, for which, however, he was renominated, but he withdrew from the campaign. He sat in Congress as a Representative from Mississippi from Dec. 1, 1855, until he died at "Monmouth," his plantation in Mississippi, July 17, 1858. E.E.T.

QUORUM, as applied to deliberative or other organized bodies, means the number of members in a meeting whose presence is necessary to make the proceedings legal. If no specific rule as to the number required has been adopted by the body, a majority of the members is regarded as a quorum. But less than a majority may, by a rule, be made a quorum; the British House of Commons requiring forty members, the United States House of Representatives a majority of all the members, the New York Senate the presence of three fifths of the members. Because of its great importance in legislation the question as to what constitutes a quorum recently assumed in the United States great interest. Each house of Congress makes its own rules of order, which must be in harmony with the constitution. The constitution provides that "a majority of each house shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members." In view of this clause of the constitution, the Thirty-seventh Congress, to which several states had failed to send representatives, decided that a majority of the members chosen constituted a quorum to do business. In the Fifty-first Congress (1889–91), the point of order was raised that no quorum had voted on a certain question under consideration, 161 yeas and 1 nay having been announced by the speaker, or 162 votes—less than a majority. Thereupon the speaker (Thomas B. Reed) directed the clerk to enter upon the journal the names of certain members as "present and refusing to vote," and ruled that a quorum was present within the meaning of the constitution. The grounds for this ruling, as stated at the time by the speaker, were substantially these: That certain members who did not vote when their names were called

were bodily present; that the speaker of the Senate of New York had decided in 1883, in a similar case, that its constitutional provision as to a quorum was entirely satisfied by the presence of the members, even if they did not vote; that in a similar case in the legislature of Tennessee in 1885 the speaker directed the clerk to count as present those there but not voting, and a quorum thus being present, he declared the bill under consideration passed; that it has always been the practice in the Parliament of Great Britain for the speaker to determine by count whether or not a quorum is present; that the constitution of the United States has a provision for compelling the attendance of absent members in order to obtain a quorum. If members can be present and not be counted as a quorum, that provision is nugatory; and inasmuch as the constitution provides for the attendance of members, attendance only is enough, otherwise the constitution would have provided for more.

The following extracts from the ninth edition of *Cushing's Law and Practice of Legislative Assemblies* on the subject of quorum are here given in further explanation of the subject:

"In all councils and other collective bodies of the same kind, it is necessary that a certain specified number, called a quorum, of the members, should meet and be present in order to the transaction of business. This number may be fixed precisely in the first instance, or some proportional part established, leaving the particular number afterward to be ascertained, with reference to each assembly, and this may be done either by usage or by positive regulation; and, if not so determined, it is supposed that a majority of the members composing the body constitute a quorum. . . . . In the United States the number necessary to constitute a quorum, in all the states respectively, and in the Congress of the United States, is regulated by constitutional provision. When the number of which an assembly may consist at any given time is fixed by constitution, and an aliquot proportion of such assembly is required in order to constitute a quorum, the number of which such assembly may consist and the number of which it does in fact consist at the time in question, is the number of the assembly, and the number necessary to constitute a quorum is to be reckoned accordingly. Thus, in the Senate of the United States, to which, by the constitution, each state in the Union may elect two members, ... the quorum is a majority of that number, whether all the states have exercised their constitutional right or not. So, in the second branch of Congress . . . . the quorum is a majority of the whole number, including the number to which new states may be entitled, whether they have elected members or not, and making no deductions on account of vacant districts."

The courts of many of the states, as well as their legislatures, have taken the same course in regard to the subject of a quorum as did the House of the Fifty-first Congress, which may best be stated in the language of the speaker, as follows:

"We must, therefore, in this House at least, consider the question settled, that if a majority are present to do business, their presence is all that is required in order to make a quorum. If they decline to vote, their inaction cannot be in the pathway of the action of those who do their duty. The idea that silence can be stronger than a negative vote seems to have been unknown to our ancestors. It seems to be a modern parliamentary fiction which has never been able to stand the examination of courts where business questions were involved. I have yet to see a single decision of a court against the position which has lately been taken by the House of Representatives."

QUO WARRANTO. One of its chief uses in the United States is to question the authority of a corporation to continue its operations as such. Throughout the United States the law generally provides that the attorney-general of the state may file the information against a corporation, and in such case he has the exclusive right to do so. He may act without leave of court. Such proceedings frequently are instituted against state, city, county and other public officers who assume official functions without proper authority. The judgment, in case the writ is sustained against an officer or individual, is ouster; against a corporation by its corporate name, it is ouster and dissolution. For a definition of the term and the uses of the proceeding in British law, see QUO WARRANTO, Vol. XX. p. 196.

R

RA—RADIATORS FOR INDOOR HEATING

RA, The Sun God. See Egypt, Vol. VII, p. 619.

RAASAY, a sound and one of the Western isles. The isle belongs to the group of the Inner Hebrides, and lies between the Isle of Skye and the mainland; the Sound of Raasay separating it from the former, and Applecross Sound from the latter. It is 13 miles in length by two and a half miles in greatest breadth. Population, 389. See Hebrides, Vol. XI, p. 542.

RABANUS, Maurus Magnentius. See Hrabanus, Maurus, Vol. XII, p. 339.

RABBINICAL LITERATURE. See Mishnah, Vol. XVI, pp. 526–531; also Talmud, Vol. XXIII, pp. 40–44.

RABBIS. See Judaism in the United States, in these Supplements.

RABBULA. See Syriac Literature, Vol. XXII, p. 869.

RACALMUTO, Italy, a hill town in the province of Girgenti, Sicily, 14 miles by rail northeast of Girgenti and Porto Empodocle on the south coast. It has mining industries, exporting sulphur, rock salt and mercury. Racalmuto was founded by the Saracens, and has a 14th century castle. Population, 12,000. C.L.S.

RACAN, Honorat de Bueil, Marquis de (1589–1670). See France, Vol. IX, p. 577.

RACCAHOUT, des Arabes, food prepared from the starch of the acorns of *Quercus ilex* and *Q. ballota*, oaks growing in Barbary. It is prepared as a sweetmeat or for use as a beverage by admixture with chocolate, vanilla, etc.

RACE, Cape, the most noted cape of the island of Newfoundland, lying near the southeast corner of the island, near the track of the principal transatlantic steamship lines. It has been the scene of many disasters to shipping, and is now surmounted with a powerful revolving beacon light, provided by the British government, and maintained by a tax upon the shipping of Newfoundland. W.F.J.

RACEMIC ACID. See Tartaric Acid, Vol. XXIII, p. 75.

RACHEL. See Jacob, Vol. XIII, p. 545.

RACINE, an important city and the county seat of Racine County, Wisconsin, in the southeastern part of the state. It lies on the shore of Lake Michigan, twenty-five miles south of Milwaukee, and is reached by the Chicago and Northwestern and the Chicago, Milwaukee and St. Paul railroads. It is the seat of Racine College, an institution of the Protestant Episcopal Church, founded in 1852, and several other educational concerns of high rank, and is well provided with public libraries, hospitals, asylums, and other urban equipments. It is a favorite place of residence, and has considerable commerce by both lake and railroad. Its population in 1900 was 29,102. See also in Vol. XX, p. 210. W.F.J.

RACINE, Louis, author; born in Paris, France, in 1692, son of Jean B. Racine. His fame rests principally on the poems *Religion* and *Grace*. He also published *Memoirs of the Life of Racine*, etc. He died in 1763. G.J.H.

RACING, horse-racing. See Horse, Vol. XII, pp. 203–210, 212; also Horse-Racing and Trotting and Pacing, in these Supplements.

RACK, of a quadruped, the method of progressive motion, in which the two feet of one side are placed upon and lifted from the ground at nearly the same moment, alternating with the two feet of the other side. In the trot, the front and hind foot of opposite sides are moved nearly synchronously; in the rack, the feet of the same side.

RACK, in mechanics. See Mechanics, Vol. XV, p. 764; in torture, see Torture, Vol. XXIII, p. 495.

RACK, an intoxicating liquor. See Arrack, Vol. II, p. 549; Cocoanut Palm, Vol. VI, p. 4; and Distillation, Vol. VII, p. 230.

RADCLIFFE COLLEGE, an institution of learning, admitting women students only, located at Cambridge, Mass. It originated in 1879 in an arrangement whereby women might receive instruction from members of the Harvard University faculty. Up to 1881 the work was carried on by a board of managers, but in that year a corporation was formed, with the title, The Society for the Collegiate Instruction of Women, which became known as the Harvard Annex. In 1894 the society took the name of Radcliffe College, in honor of Anne Radcliffe, the founder of the first Harvard scholarship, and a closer relation was established between the institution and Harvard. Its degrees bear the Harvard University seal. R.W.C.

RADIATORS FOR INDOOR HEATING. Radiators for heating by means of steam or hot air are made in the form of hollow vessels or coils of pipe. The latter form is most common, and is varied in arrangement and appearance principally to secure ornamental effects, that the radiator may present a sightly addition to the furnishings of an apartment. Heating by low-pressure steam necessitates a boiler partially filled with water, the maintenance of a water-line and radiators or coils at a proper distance above this line, and equal pressure on all parts of the system, with provision for relieving all radiators and supply-pipes from condensation and returning it automatically to the boiler. Latent heat is absorbed while the water is being converted into steam, which is obtained only while the water is held under a pressure above the atmosphere (unless steam is condensed by mechanical attachments). To utilize this latent heat for warming the air in a room, the steam is condensed by

contact of air with the outside surface of the radiator, and the water thus obtained is returned to the boiler. The system of piping for this method varies with the requirements of different buildings and apparatus. Direct, indirect, or direct-indirect radiators are used, or a combination of all, according to the requirements of ventilation, etc. A direct radiating surface consists of radiators or coils placed in the rooms to be warmed without a supply of fresh air. The heat is absorbed by the air in contact with the radiator, causing it to expand, rise, and become displaced by the heavier, cooler air, which in turn is warmed. An indirect system of heating is effected when the radiators or coils of pipe are placed in the basement or some lower room, and inclosed in chambers, usually boxes lined with tin. Outside air is conveyed to the chambers through ducts, and becoming heated, ascends to the desired points. A direct-indirect radiating surface consists of direct radiators with closed base, outside air being conveyed through a duct to the heating surface, where it is heated and discharged into the room.

C. H. COCHRANE.

RADICAL AXIS. See CURVE, Vol. VI, p. 634.

RADICLES. See CHEMISTRY, Vol. V, pp. 403, 478.

RADIOLARIA. See PROTOZOA, Vol. XIX, p. 872.

RADIOMETER. See PNEUMATICS, Vol. XIX, p. 261.

RADIOPHONE. See TELEPHONE, Vol. XXIII, pp. 140–145.

RADISH, vegetable. See HORTICULTURE, Vol. XII, p. 299.

RADIUM. A substance, discovered by M. and Mme. Curie, of France, in 1898, having marvelous physical and chemical properties. It has the power of giving out light perpetually without any apparent exciting cause, of emitting rays that penetrate solids, of acting on sensitized plates, of making air an electric conductor, and of radiating heat. Radium does not exist in nature as a pure or distinct metal, but is extracted from a mineral called pitchblende and tons of minerals have to be subjected to laborious processes in the chemical laboratory to obtain a few grammes of the material. Its great rarity and astounding potency make it exceedingly precious.

RADIUS. See ANATOMY, Vol. I, p. 725.

DR. JOHN RAE.

RAE, JOHN, explorer; born in the Orkney Islands in 1813; began the study of medicine in Edinburgh in 1829, and received his degree in 1833. Shortly after he was appointed surgeon to a ship of the Hudson Bay Company. In 1845 he took command of an expedition to the Arctic seas for the purpose of surveying about 700 miles of coast which formed the shores of a large bay, and was successful in the venture. In 1849–50 he commanded an expedition to search for Sir John Franklin. He first traveled 1,100 miles along the shore of Wollaston Land, and then explored the east shore of the Coppermine River for 300 miles. He next searched Victoria Land and Victoria Strait. Thence he journeyed 1,350 miles to what is now the city of Winnipeg, Manitoba, and finally made a trip of 1,100 miles, of which 400 miles had never before been explored. He secured relics and facts of Franklin's fate. Returning home he received $50,000 as a reward for the first information furnished as to the fate of Franklin. He also, in recognition of his explorations, received the Founder's Gold Medal of the Royal Geographical Society. He died in London, England, Jan. 24, 1893. G. J. H

RAFFLESIA. See PARASITISM, Vol. XVIII, p. 269.

RAFINESQUE, CONSTANTINE SCHMALTZ, a botanist and traveler; was born at Galata, a suburb of Constantinople, in 1784, his father being a French merchant in the Levant. He visited the U. S. in 1802 and made many botanical collections. From 1805 to 1815, he lived in Leghorn and Sicily, and published there *The Flora and Natural History of Sicily; Sicilian Ichthyology* (1810); *Sicilian Crustaceoüs Animals* (1814). He returned to America in 1815, and in 1818 was made professor of botany at Transylvania University at Lexington, Ky. In 1830 he settled in Philadelphia. He wrote *Annals of Kentucky* (1824); *The American Florist* (1832); *The American Nations* (1836); *Medical Flora of the United States* (1828); *A Life of Travel and Researches* (1836), and *The Genius and Spirit of Hebrew Poetry* (1838). Many of his manuscripts are in the National Museum at Washington. Died in Philadelphia, Sept. 18, 1842. *Revised by* R. W. C.

RAGNAROK. See ÆSIR, Vol. I, p. 189.

RAGONA, DOMENICO, an Italian astronomer and meteorologist; born in Palermo, Sicily, Jan. 20, 1820. While still young he was appointed assistant professor of physics at the University of Palermo. In 1851 he was sent to Germany, at the expense of the government, to perfect his knowledge of astronomy. He studied in Berlin under Encke, and in Bonn under Argelander, and was esteemed greatly by Humboldt. On his return he was appointed director of the Observatory of Palermo and professor of astronomy. In 1860 he was transferred to the Observatory of Modena, Italy. In 1870 he established a network of meteorological field-stations in the province of Modena, the first in Italy. The results of his work in astronomical science have been published in the *Transactions* of the Berlin Observatory, the *Bulletin International*, the *Astro-Meteorological Journal*, *Memoirs of the Society of Natural Sciences*, and other journals. He published numerous papers and dissertations on meteorology, invented many new instruments, and founded the Italian Meteorological Society, presiding over it for the first three years. He was counted among the most illustrious of meteorologists.

RAGUET, CONDY, merchant and political economist, was born in Philadelphia on January 28, 1784, was educated at the University of Pennsylvania, and became a lawyer. He turned from

that profession into mercantile life, in which he was highly successful. In 1815 he entered the Pennsylvania legislature, and in 1822 was made consul at Rio Janeiro, in which capacity he negotiated a commercial treaty with Brazil, and he was then made *chargé d'affaires*. After five years in Brazil he returned to the United States, and became the editor of several journals devoted chiefly to free trade principles. He was the author of *Principles of Free Trade*, *On Currency and Banking*, and *A Short Account of the Present State of Affairs in Santo Domingo*. He died on March 22, 1842. W. F. J.

RAHBEK, KNUD LYNE. See DENMARK, Vol. VII, pp. 79, 80.

RAHWAY, a city of New Jersey, on the Pennsylvania railroad. Population 1890, 7,105; 1900, 7,935. See RAHWAY, Vol. XX, p. 228.

RAIIDÆ. See RAY, Vol. XX, p. 312.

*RAILROADS IN THE UNITED STATES. Transportation by rail has become interwoven with all the great industries of the nation. The Baltimore and Ohio railroad, the first railroad undertaken in the United States having for its object the transportation of passengers and freight, was opened from Baltimore to Ellicott's Mills, a distance of 14 miles, on May 24, 1830. The whole main stem, from Baltimore, Maryland, to Wheeling, 380 miles, was not opened, however, until Jan. 1, 1853.

Following the Baltimore and Ohio, the next important line to be undertaken was the Charleston and Hamburg railroad (afterward the South Carolina, and now [1896] the South Carolina and Georgia), extending from Charleston, South Carolina, to Hamburg, on the western line of the state, opposite Augusta, Georgia. The length of this line is 137 miles. Its construction was begun in 1830 and the whole line was completed and opened for business Oct. 1, 1833, being at that time the longest continuous line of railway in the world. Upon this line the first locomotive built in the United States was run. It was called "The Best Friend of Charleston," and was built at the West Point foundry in Cold Spring, Putnam County, New York. It arrived in Charleston, Oct. 23, 1830, and was placed on the road for an experimental trip, Nov. 2, 1830. On the 15th of January, 1831, the anniversary of the commencement of the construction of the railroad, this engine made its first regular trip.

Although this was the first locomotive to be built in the United States, it was the second to be put into use, the Delaware and Hudson Canal Company having, in 1829, imported the "Stourbridge Lion," an engine constructed by Foster, Rastrick and Company of Stourbridge, England, for use on its Carbondale and Honesdale railroad. The experimental trip of this engine was made Aug. 8, 1829, in charge of Horatio Allen, that being the first and only time that that distinguished engineer ran a locomotive-engine. The "Stourbridge Lion" was found too heavy for the track it was employed upon, and its use was discontinued after a short time.

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The first railroads seem not to have been very remunerative. They were rude structures compared with the roads of the present day; nevertheless, the people continued to build them, and at the close of 1835 about eleven hundred miles of road had been completed. From this period to 1837 vast railroad projects were entered upon, but, owing to the general financial depression, comparatively little was accomplished till about the time of the acquisition of California.

In 1840 there was a well-defined system of railroads in New England, which has Boston for a center. The Eastern railroad was in operation from Boston to Portsmouth; the Boston and Lowell and the Lowell and Nashua formed a continuous line from Boston to Nashua; the Boston and Providence was completed to Providence, and the New York, Providence and Boston continued that line from Providence to Stonington. Of the present Boston and Albany line, three sections were then completed; from Boston to Worcester, 44.63 miles, built by the Boston and Worcester Railroad Company; from Worcester to Springfield, 62.60 miles, built under the charter of the Western Railroad Company; and from Hudson, New York, to Pittsfield, Massachusetts, 46.51 miles,—making a total of 153.74 miles. The last-mentioned section was composed of a portion of the western division of the Western railroad, from the New York state line to Pittsfield, Massachusetts; the remaining portion, all in the state of New York, was built by what was known as the Hudson and Berkshire Railroad Company. This left a gap between Pittsfield and Springfield on the Western railroad, which was completed in 1841, and the whole line opened throughout in September of that year.

In 1840 the Boston and Maine railroad was being operated from Wilmington to Exeter, and the Boston and Lowell tracks were used to gain entrance to Boston. The Norwich and Worcester was in operation between Worcester, Massachusetts, and Norwich, Connecticut, and the New Haven and Hartford was completed between the two points named in its title.

The following statement shows the mileage of railroad in the United States at the end of 1840, in operation and nearing completion:

STATES AND TERRITORIES.	MILES OF RAILROAD.
Maine	14.50
New Hampshire	37.30
Massachusetts	305.99
Rhode Island	43.40
Connecticut	94.50
Total New England states	495.69
New York	373.44
New Jersey	197.05
Pennsylvania	635.35
Delaware	39.19
Maryland	204.36
Total Middle states	1,449.39
Ohio	38.00
Michigan	118.90
Total Western states	156.90

States and Territories.	Miles of Railroad.
Virginia	301.71
North Carolina	92.10
Kentucky	29.00
South Carolina	204 00
Georgia	275.00
Alabama	46.00
Total Southern states	947.81
RECAPITULATION.	
New England states	495.69
Middle states	1,449.39
Western states	156.90
Southern states	946.81
Total United States	3,048.79

The great movement in the construction of railways, however, dates from the discovery of gold in California. The effect upon the industries and commerce of the country, of the sudden addition of more than $50,000,000 annually to its circulating medium, was prodigious. For the increased wealth and newly-created enterprise of the nation, the railway offered the most attractive and appropriate field. From 1849 to 1857, 17,138 miles of railway were constructed. Then came a great commercial revulsion, which, commencing in the United States, swept round the world. But the nation had grown too strong to suffer anything more than a temporary check. The lines of railroad which had been constructed penetrated every important portion of the country, and gave a high commercial value to all its products. Labor everywhere was thus enabled to reap, even in the midst of the great depression that prevailed, a remunerative return.

In 1848 a continuous line of railway was formed between Boston and New York City by the completion of the New York and New Haven railroad, its formal opening occurring on the first day of January, 1849.

In 1851 the Erie was opened from the Hudson to Lake Erie. Soon after the opening of the Central line, in addition to the ordinary charges for transportation, canal tolls were imposed upon all freight passing over it, to prevent the diversion of traffic from the canal, the railroad and canal being parallel for their whole length. In 1851 the Central line was relieved from the canal tolls, on the ground that it should be placed on as favorable footing as the Erie, which by its charter was exempted from them. In 1851 the Hudson River railroad was opened, and with it two lines of railroad from the harbor of New York to the lakes, neither of them being subject to any other burden than the cost of transportation. The total through tonnage of the only roads that could then compete with the canals—the Baltimore and Ohio not being opened until 1853, nor the Pennsylvania till 1854—was 78,134 tons; the through west tonnage of the two roads for the year was 46,601 tons, against a through tonnage on the canal from the Western states of 1,151,978 tons, or, including that from Buffalo of fully 1,300,000 tons, a total of about 2,450,000 tons; in other words, a quantity twenty-six times greater than that of the two railroads competing for its business.

In 1852 the Michigan Central and Michigan Southern roads were completed to Chicago. Since and including the year 1849, the average annual increase of railroads in the United States had been 1,728 miles. Up to 1849, the average annual increase in miles of road was 316.

From 1861 to 1864 railroad construction was virtually suspended, the total additions during that time being only 3,273 miles, of which 133 miles were in New England, 1,235 in the Middle states, 1,433 in the Western states, 143 in the Pacific states and 329 in the Southern states. In 1840 the rates of mileage of railroads to population was one mile of road to every 7,415 inhabitants; in 1850 it was one mile to every 3,298; in 1860 one mile to 1,083. In the gold-producing states the railroad system was slow to start its development. Till 1855 there were no railroads in the Pacific states. During eight years more there were less than thirty miles, and the cost of transportation was enormous.

From 1865 until 1873 the construction of new lines of railroad progressed with unusual vigor, due in a measure to the great abundance of capital, but primarily to the undertaking of the Pacific lines of railroad under the stimulus of government aid. In this period no less than 36,359 miles were added to the country's railway ramifications, being an increase of nearly 107 per cent. In other words, more railroads were built in these nine years than in the preceding 34 years.

The financial disasters of 1873 were followed by a long period of depression in all the industries of the country. Though in none was it more marked than in that of railway extension, yet such were the requirements of the country that in the five years, 1874 to 1879, there were added 16,316 miles of road, an annual average of 3,263 miles, against an average of 4,040 miles per annum during the nine years preceding.

In the following statement the progress of railroads in the two periods above referred to is clearly set forth:

States.	1864.	1873.	Incr'se 1873.	1879.	Incr'se 1879.
New England states	3,793	5,314	1,521	5,903	589
Middle states	7,580	13,028	5,448	14,985	1,957
Central Northern states	10,570	20,174	9,604	24,004	3,830
South Atlantic states	5,519	7,474	1,955	8,215	741
Gulf and Mississippi states	3,865	6,118	2,253	6,812	694
Southwestern states	1,454	8,114	6,660	11,843	3,729
Northwestern states	962	7,519	6,557	10,414	2,895
Pacific states	166	2,527	2,361	4,408	1,881
Total United States	33,909	70,268	36,359	86,584	16,316

From 1874 to 1888 there were built 85,901 miles of new railroad, an increase of over 122 per cent; that is, in these fifteen years there were built 15,633 miles of railroad more than were built in the preceding forty-five years. The first five of these fifteen comprised a period of depression, the next four years were years of unexampled activity, while the three years of 1883, 1884 and 1885 were years of hesitancy, in which

no new railroad enterprise of great magnitude was begun, as was natural, after the completion in a single year (1882) of nearly 11,600 miles of road. In 1886 there were added 8,018 miles and in 1887 12,878 miles, the latter surpassing the record of any previous year; and in 1888 6,912 miles. In the three years the new construction aggregated 27,808 miles, or within 351 miles of the extraordinary record of the three years from 1881 to 1883. In these two periods (1881–1883 and 1886–1888), covering only six years of national existence, 56,000 miles of railroad, being more than 30 per cent of the total in operation in 1895, was built at a cost, meaning a permanent investment, of $1,750,000,000.

Since 1888 there has been a steady decline in railway construction, as shown in the appended tables, embracing all the United States.

Years.	Miles New Railroad Built.	Total Railroad Mileage.
1881	9,778.85	103,143.00
1882	11,599.52	114,712.00
1883	6,818.72	121,455.00
1884	3,973.71	125,378.51
1885	3,131.14	128,360.78
1886	8,128.48	136,400.51
1887	12,983.62	149,256.76
1888	7,066.00	156,169.13
1889	5,695.67	161,352.82
1890	5,656.70	166,690.56
1891	4,620.41	170,762.43
1892	4,584.01	175,181.06
1893	2,789.02	177,457.96
1894	2,157.39	179,279.34
1900	---------	193,345.78

Pacific Railroads. The completion of the Union Pacific Railroad on the 8th of May, 1869, and the opening of the first through transcontinental route formed thereby, has been deservedly classed as among the most potent factors in the extraordinary growth of the great West, as well as one of the strongest ties which has bound the rapidly growing communities of the Pacific slope with the people east of the Mississippi River.

Important as was this event, it was overshadowed by the completion, in 1883, of three other transcontinental routes in different sections of the country. While the year was yet in its infancy, the Southern Pacific and the Galveston, Harrisburg and San Antonio Railroads formed a junction at El Paso, Texas, and established a route running westwardly and northwestwardly from New Orleans through the states of Louisiana, Texas, New Mexico, Arizona and California to San Francisco.

The opening of the Northern Pacific railroad attracted widespread attention, not only on account of the elaboration of details attending it, but for being the completion of a stupendous enterprise. Chartered in 1864, it was not until 1869, when the Union Pacific had been completed, that construction was actually begun. In 1873 there were completed on the eastern end 450 miles of road from Duluth, Minnesota, west to Bismarck, Dakota, and on the western end 105 miles from New Tacoma, Washington, to Kalama. The financial disasters of that year were more than the enterprise at that stage of its existence could withstand. It was sold, and reorganized; and when the financial storm had spent its force, in 1879, the Northern Pacific Railroad Company began anew the work of construction on the west bank of the Missouri River, opposite Bismarck; and several months later, on the western division of the line at the confluence of the Columbia and Snake rivers, in Washington Territory. The intervening gap between those points was 1,222 miles; and until complete success was achieved by the driving of the golden spike, on Sept. 8, 1883, the work progressed without serious interruption.

Following closely on the opening of the Northern Pacific came the announcement of the completion of the western division of the Atlantic and Pacific railroad to the Needles, on the Colorado River, where connection is made with the Southern Pacific railroad of California, and forming, in connection with that line and the Atchison, Topeka and Santa Fé, with which connection is made at Albuquerque, New Mexico, the fourth transcontinental route.

Besides these lines the other important extensions in the section of the country west of the Mississippi and east of the Rocky Mountains were by the St. Paul, Minneapolis and Manitoba, now the Great Northern system, which extended its line westward to Helena. The Chicago and North-Western was equally active in forwarding its western extension to Fort Casper, Wyoming, the Burlington in extending its line to Denver and more recently in a northwesterly direction to Merino, Wyoming, and the St. Paul in securing a line to Kansas City. All of these lines added considerably to their mileage in the way of branches, etc., and a vast number of important independent lines were also constructed. But the chief event of the period in that section of the country was the great battle of the powerful railroad corporations for territorial control. In the great struggle that ensued from the rivalry of the Atchison, Missouri Pacific, Rock Island, the Burlington and the Union Pacific companies, a far greater extent of mileage was added than under ordinary circumstances would have been constructed in a quarter of a century.

Rails. The pattern of rail now in general use was designed by Mr. Robert L. Stevens, who was actively identified with the construction of the Camden and Amboy railroad in New Jersey, upon which line rails of this style were first laid. These rails were made in England, there being at that time no rolling-mill in the United States capable of manufacturing them.

"The rails," says a historian of that road, "are of rolled iron, 16 feet long, 2⅛ inches wide on the top, 3¼ inches at the bottom and 3½ inches deep; the neck ½ inch thick. The weight is 209 pounds, equal to $39\frac{3}{16}$ pounds per yard. They are secured by clamps of iron, riveted at the extremity of each bar. The rails are attached to the stone blocks and sleepers by means of nails or pins at the sides, driven into wooden plugs. Chairs are dispensed with." The use of the H or T rail spread rapidly

to all the chief roads of the United States. It became widely known as the Vignoles rather than the Stevens rail, because a European engineer, Mr. C. B. Vignoles, hastened its introduction on European railways, using them on English roads during the progress of construction to an extent that gave to them the title of contractors' rails.

In 1863 the first steel rail was laid in the tracks of an American railroad. Steel rails were then in use in Great Britain, to a very limited extent, however, but so enthusiastic in their praises were the railroad managers who had tried them that the Pennsylvania Railroad Company was induced to order a small lot with which to make experiments, and accordingly purchased one hundred tons of English steel rails, paying $150 gold per ton, equivalent at that time to over $300 in United States currency. These rails were made of crucible steel, and proved to contain such a large percentage of carbon that many of them broke during the following winter, which was unusually severe. The company was not discouraged by this unfortunate experience, but gave further orders for 500,000 ton lots, which were presumably made of softer metal. In 1864 imported steel rails sold at $162.50 gold per ton, or about $250 per ton currency, but later in the year they sold at $135 gold. The Bessemer process of steel production was then in its infancy.

On May 24, 1865, the first Bessemer steel rail made in the United States was rolled by the North Chicago Rolling-Mill Company from steel made at Wyandotte, Michigan, this being an experimental rolling of but six rails. In 1867 some tons were also rolled in an experimental way by the Spuyten Duyvil (New York) Rolling-Mill from steel made at Troy, New York. In August, 1867, the Cambria Iron Company began to roll Bessemer steel rails in the way of regular business. Other companies soon followed in their wake, and from 1870 the Bessemer steel-rail manufacture assumed in the United States the position of an established branch of the iron and steel trades.

The following statement showing the mileage of iron rails and of steel rails in the total track-mileage of the United States is taken from Poor's Manual for 1901:

Year.	Miles Steel Rails.	Miles Iron Rails.	Total Miles.	Per Cent Steel of Total.
1881	49,063	81,473	130,536	37.5
1882	66,691	74,269	140,960	47.3
1883	78,491	70,692	149,183	52.7
1884	90,243	66,254	156,497	57.6
1885	98,102	62,495	160,597	61.0
1886	105,724	62,324	168,048	62.9
1887	125,459	59,588	185,047	67.7
1888	138,516	52,981	191,497	72.3
1889	151,723	50,513	202,236	75.0
1890	167,606	40,697	208,303	80.4
1891	174,931	39,756	214,687	81.5
1892	182,858	38,641	221,499	82.6
1893	191,857	37,155	229,012	83.8
1894	197,653	35,266	232,919	84.8
1895	206,546	28,652	235,198	87.8
1900	239,629	18,224	257,853	92.4

Locomotives. A great advance in railway traffic came from the introduction of Bessemer steel rails. It rendered possible an increased weight of locomotives and higher rate of speed, resulting in an enormous increase in the carrying capacity per train of the railroads and in more prompt and efficient service both for passenger and freight traffic. Nothing can be more striking than to contrast the present engine with that of 1826. The locomotives first constructed weighed only from three to six tons, and were hardly capable of drawing on a level road half the weight of the improved machine of to-day.

Originally the locomotives constructed in this country followed closely the model of the English imported engines, but these were found to be inadequate. The first improvement of importance was the swiveling truck, first suggested by Horatio Allen, but whose invention is accredited to John B. Jervis. This truck, placed under the front end of an engine, enables it to run around curves of almost any radius. As many of the first lines in the mountainous sections of the country were built with sharp curves in order to limit the cost of construction, this invention solved the problem of building an engine that might be successfully worked on them. The swiveling truck was first used on an engine on the Mohawk and Hudson railroad (New York) in 1831.

Another objection to engines of the English pattern was, that in running over rough or unevenly laid tracks these locomotives constantly ran off the tracks, and this led to the invention of the equalizing beams or levers (patented in 1838 by Joseph Harrison, Jr., of Philadelphia), by which the weight of the engine is always borne by three out of four or more driving-wheels.

It is recorded that one of the first locomotives built in this country, the "South Carolina," designed by Horatio Allen, had eight driving-wheels, but with few exceptions all the early locomotives had but four wheels.

In 1836 Henry P. Campbell of Philadelphia patented the use of two pairs of driving-wheels and a truck, the driving-wheels coupled by rods. So generally has this plan of construction been adopted in America that this description of engine became known as "The American type of locomotive."

The first "Mogul" engines were built in 1863; the first "Consolidation" engines about 1866. The tendency at all times was toward increased efficiency, which necessitated constant additions to the weight of the locomotive. The evolution of the locomotive from an engine weighing four to seven tons in the first years of railroad development to the seventy-ton machine of the present day, was gradual, though remarkably rapid, when it is considered that the whole fabric of the present almost perfect method of railroad transportation is the development of only seventy years.

The most radical departure of late years has been the use of compound locomotives, which has resulted in increased economy in fuel rather than

increased capacity of power and speed, and the highest speed-records are those which have been made by simple engines. The first successful compound locomotive built in the United States was designed and constructed by the Schenectady Locomotive Works. This was a heavy ten-wheel passenger engine for the Michigan Central railway, and it did excellent service.

One of the most noticeable changes since 1880 has been the increase of boiler-pressure from 130 or 140 pounds to 180 or 190 pounds, and many engines are now running with as much as 200 pounds pressure. The steam-pressures now used in locomotives are the same as carried in the latest steamship practice, where the steam is used in triple and quadruple expansion engines. Increase in boiler-pressure, by imparting greater velocity of steam, leads directly to higher speeds, as well as to increased economy in coal.

Driving-wheel weights have increased since 1880 from 12,000 or 14,000 pounds, which was then about the maximum figure, to the present figures of 20,000 to 23,000 pounds, and thus has had a most noticeable effect on the capacity of locomotives for power and speed. Light engines, of course, can make high speeds with small trains, but modern express service requires high speed with very heavy trains.

Considerable improvement in valve-motion has also been made, leading to reduced back-pressure and greater efficiency of steam; but it is noteworthy that these improvements are simply an improved design of the original Stevenson link-motion which has been used since locomotives were first built. The use of the compressed-air sand-blast has been of much value in producing greater adhesion of the driving-wheels on slippery rails. Much better protection is given to locomotive boilers now than formerly, resulting in increased economy of coal and greater capacity for power and speed.

Other noteworthy improvements consist in lightening all parts as much as strength will allow, in order to permit the use of the largest boiler. The capacity of a locomotive at high speeds is limited entirely by the power of the boiler to make steam, and as the maximum weight of the engine is limited by strength of rails and bridges, everything which tends to lessen dead weight and permit of large boilers has a direct effect in increasing the power and speed of locomotives. Cast-steel driving-wheels, for instance, are now largely used instead of cast iron; foot-plates are made of cast steel instead of cast iron, and in many other details cast steel and wrought steel have been substituted for iron with a considerable reduction of weight and increase of strength.

The increase in boiler capacity has led to the use of much higher locomotives than formerly; fire-boxes are now put on top of the frames, and even extended over the wheels, in order to allow the use of larger grates. Fears were at first entertained that engines having these high centers of gravity would not be as safe for high speeds as the lower engines. These fears, however, proved unfounded, and the high locomotives are seen to have a more gradual and easy motion than the lower ones, and we know of no case on record where the high center of gravity has led to accident.

In freight service the same line of development has taken place as in passenger, it having been proved that the cost per ton per mile is less by hauling the most cars per train; though this is modified by competition, which has led to higher speed of freight trains, so that on some roads the fast-freight service approaches the conditions of heavy passenger service, as far as locomotive requirements are concerned, and some engines are frequently used for both classes of work.

For mountain service slow speeds are used, and all effort is directed to hauling the heaviest possible train. This involves the use of the greatest wheel weights that the rail will stand, and the use of the consolidation or decapod type of locomotives with four or five pairs of drivers coupled. For fast-freight service engines of the mogul or ten-wheel type, with 100,000 to 120,000 pounds on six drives, are used, and having as much as 70 tons total weight. For mountain service, consolidation or decapod engines are built, having 22-by-26 or 23-by-28 inch cylinders, with a total weight of from 80 to 100 tons, exclusive of tender.

Passenger-Cars. In early railroading there was little difference in appearance between the passenger-car and a freight caboose. Some attempts at ornamentation were made by a few of the companies, but these were modest enough, consisting simply of ornamental painting, scenes from life, more or less artistically executed, and very simple arrangements for comfort. In addition to improving the ventilation, candle-light was provided for night travelers, and in cold weather a stove in the corner furnished the heat which travelers had been wont to draw from each other or in small degree from the straw with which the car-floor had been strewn. As travel increased, however, and the need of better accommodations became apparent, the passenger-car was lengthened and its height increased; its ventilation was improved and conveniences of various kinds added. A great step forward was taken when provision was made for sleeping in a recumbent posture. A night car with rude sleeping-berths, such as are in use on steamboats, but furnished with no bedding, was the first form of sleeping-car which surprised and delighted the traveling public. It was introduced on the Cumberland Valley railroad, in Pennsylvania, so long ago as 1836, and in November, 1838, the Philadelphia, Wilmington and Baltimore put on a similar car.

In 1854 sleeping-cars having the same general features as those now in use were introduced. This car provided seats for about sixty passengers, and at night these seats were converted into flat berths. The inventor was Theodore T. Woodruff. The right to build and operate the car was later acquired by Webster Wagner.

Pullman sleeping-cars were introduced in 1864 or 1865. In 1867 a hotel-car, the first in use, was built by him for the Great Western railway of Canada, and in 1868 Wagner built the first two drawing-room cars ever run for pay. Various styles of special cars have since been built; as, the hotel car, the private car, the hunting-car, the observation-car, the library-car, the dining-car, the composite car, and the combination-baggage-dining-room-car—all worthy of mention. Buffets were introduced by the Pullman Company into parlor and sleeping cars in 1883. For supplying heat alone, improvements in processes to the number of several hundred have been patented. Heating by salt-water circulation once displaced the use of stoves; afterward, steam-heating was substituted; finally, successful experiments in heating cars by electricity have been recorded. In lighting passenger-cars several forms of compressed gas have been substituted for candles and oil-lamps. All first-class passenger and sleeping cars are now equipped for electric lighting, so that such illumination can be introduced at any time. Water

for toilet purposes is supplied on first-class cars, and on Pullman, Wagner and many private cars both hot and cold water are provided. The water is stored in tanks underneath the cars and forced by air-pressure into the basins. The air-pressure system was first put into use in February, 1888, by the Pullman Company, and is now in general use on their cars. It is applied to lavatories, closets, bathrooms, dining-rooms and barber-shop basins. Hot water or cold water may be drawn from the same faucet, according as it is turned in one direction or in the other.

For steadying the cars while in motion and preventing accidents, various devices have been adopted. One of the most important of recent improvements in palace-cars is the patent buffer at the end of each platform. This obviates the danger of getting the foot caught between the platforms, and also imparts a steady motion to the train. In case of a collision it effectually prevents the cars from telescoping; a security still further augmented by the vestibule connections originated by the Pullman Company in 1887. The first vestibuled train was built at Pullman, and put into service on the Pennsylvania railroad in April of that year.

This vestibule construction involves a solidly continuous system of combination bottom and top buffers, and heavy diaphragm frame-plates rigidly attached to the buffers, and which permit of the use of additional cushion springs at both top and bottom of the frame-plate buffers, thus distributing the impact in collision to the parts of the framework of the car best calculated to withstand the shocks. A vestibule train is perfectly sinuous, and is virtually under one continuous roof, with inclosed passages from car to car.

The Pullman anti-telescoping devices consist of heavy steel plates two feet wide, extending across the car and bolted to the bottom of the sills and between them and the platform timbers; also of heavy steel angle-bars back of the corner-posts or end framework of the car, strongly secured to the heavy steel plates. These angle-irons extend in a continuous bar upward and across the roof, and downward on the opposite side to the sills, thus reinforcing the end framework of the car with a hollow cylinder casement of great strength, which not only keeps the car-frame in proper shape, but prevents the end of the car from being broken in case of collision.

Since 1880 the length of passenger-cars, which was then from forty to fifty feet, has been greatly increased, so that now sixty feet is not an unusual length, and many recently built Pullman coaches are seventy feet in length over ends. The body-framing of cars, also, has been greatly improved; trucks are much heavier, with larger wheels; and brakes have been improved by the quick-action feature. Much attention has also been given to the improvement of springs; and comfortable high-back seats have been introduced, rendering riding far more comfortable than formerly. Great advances, too, have been made along the line of art-work, to conform to new styles adopted from time to time.

The government has already issued 3,000 patents for railroad brakes alone, 7,000 for railway draft appliances, 6,000 for railway rolling-stock, and 8,500 patents are classed under the head of railways. Four fifths of these patents have been issued since 1880, an evidence of immense inventive activity. During the year 1894, 684 patents were issued for improvements on cars and parts of cars, car-couplers alone receiving 218 patents. The railways and railway appliances received 562 patents in 1894, as against 735 for the year before.

FREIGHT-CARS. The introduction of steel rails led to the construction of heavier freight-cars, for it was found that such rails would bear heavier loads without danger. By increasing the weight of the car from, say, 18,000 pounds to 21,000 pounds, its capacity was increased from 20,000 to 30,000. A further increase in weight to 22,000 or 24,000 makes it possible to carry a load of 40,000 or more. The loads can be increased in weight faster than the cars, and thus the "paying" weight constitutes a larger percentage of the total hauled. The normal freight-car in 1870 weighed 18,000 pounds and carried a load of 20,000. Freight-cars of to-day are from 34 to 40 feet in length, weigh from 29,000 to 36,000 pounds, and carry loads of from 60,000 to 70,000 pounds, the 60,000-pound car being now considered the standard. During the year 1895–96 coal and ore cars of 80,000 pounds capacity were added to the equipments of a few of the leading railroads.

The following table shows the relative increase since 1876 in dead weight of car, and paying load:

YEAR.	DEAD WEIGHT OF CAR.	WEIGHT OF PAYING LOAD.	TOTAL WEIGHT LOADED.	WEIGHT OF CAR. PERCENTAGE OF TOTAL.	PAYING LOAD. PERCENTAGE OF TOTAL.
	Lbs.	Lbs.	Lbs.	Per cent.	Per cent
1876-----	20,500	20,000	40,500	53.62	46.38
1882-----	24,000	40,000	64,000	37.50	62.50
1889-----	27,700	60,000	87,700	31.59	68.41
1895-----	36,000	80,000	116,000	31.04	68.96

The construction of wooden cars of a greater capacity than 70,000 or 80,000 pounds is not probable, because the increase which would be necessary in size and weight of the parts would increase the dead weight and decrease the paying load. Future development must come through the increased use of metals in car construction. Car-trucks now are made entirely of steel, and it is predicted that in the near future the entire bodies of freight-cars will be made of steel. Steel cars were built by the Carnegie Steel Company and put on exhibition at the convention of the Master Car-Builders' Association in 1896.

In variety, freight-cars are especially adapted to many uses. There are now ventilated refrigerator-cars for the transportation of fruits, vegetables, fresh meats and other perishable goods; cattle-cars with arrangements for watering and feeding stock while in transit; single and double deck cars for sheep and hogs; improved box-cars for general merchandise; special cars for furniture and other light-bulk freight; improved flat-cars for lumber and stone; double and single hopper-bottom cars for coal, crushed stone, etc., and special cars for ores, of which the heavier ones are often lined with iron plates. There are poultry-cars, in which birds are fed and watered. Other special cars are caboose-cars, horse-cars, coke cars, barrel-cars, as well as flat-cars from 60 to 70 feet in length, upon which street cars are shipped.

SAFETY APPLIANCES. In 1880 freight-cars were used with single brakes, and the brake-beams were of wood and in most cases not trussed. By an act of Congress, approved March 2, 1893, the companies engaged in interstate commerce are required to equip their cars with automatic couplers and brakes and other appliances for insuring safety to trainmen, and the companies

were allowed until Jan. 1, 1898, to comply with these requirements.

Improved brakes enable trains to make better time, to be quicker halted and thereby avoid accidents. Improved draw-bar and buffer attachments have also been applied, likewise additional grab-handles, steps and ladders for the protection of trainmen. All freight-cars now building, with few exceptions, are equipped with Master Car-Builders' vertical-plane automatic couplers, and the old link-and-pin draw-bar in general use in 1880 is rapidly being displaced.

One part of a car has not yet been treated fairly, and that is the wheel. The flange of the wheel is no larger than many years ago, and the weight of the wheel has been increased but little. The steel tire has gained largely in weight, and the wheel should be increased to at least 650 pounds, and 700 pounds would be still better.

While there are many different doors in use, there is none wholly satisfactory. The same applies to car-roofs. Also, there should be uniform type of draft-rigging. These three matters are of pressing importance, for it is the universal experience that the roof, the doors and the draft-rigging are the great items of expense in maintaining equipment.

The following table shows the equipment growth of American railroads from 1880 to 1900:

Year.	Locomotive Engines.	Revenue Cars.			Total.
		Passenger.	Baggage, Mail and Express.	Freight.	
1880---	17,949	12,789	4,786	539,255	556,930
1885---	25,937	17,290	6,044	805,519	828,853
1890---	32,241	22,958	7,253	1,061,917	1,092,241
1900----	38,065	26,786	8,209	1,350,258	1,385,253

Since 1880 the number of locomotives has increased 106.64 per cent; of passenger-train cars 104.10 per cent, and of freight-train cars 128.25 per cent. In 1880 the ratio of passenger-cars to locomotives was as 98 to 100; in 1895 it was as 97 to 100. In 1880 there were 30.04 freight cars for each locomotive, and in 1895, 33.18. Since 1882, the year for which the statistics were first compiled, the average tonnage weight of a freight train, measured by the number of tons hauled per freight-train mile was 125.86 tons; in 1895 it had increased to 180.23 tons.

The average number of miles run per annum by each freight-car in service ranged from about 450 miles in 1883 to 408 in 1888, then increasing to about 450 in 1890, 1891 and 1892, followed by a further decline to less than 400 miles in 1894 and 1895. It is because of this unsatisfactory lack of uniformity in service derived from their freight equipment that the railroad companies are now carefully considering plans looking toward the adoption of some system of pooling freight-cars.

Speed. Attention was first drawn to the possibility of materially lowering the time allowance on long runs by the performances of the train which bore the Jarrett and Palmer theatrical troup from New York to San Francisco in June, 1876. The run of 3,312 miles was made in just a quarter of an hour short of three and one half days, or at the rate of 40.18 miles per hour. At the present day this would be regarded as a creditable performance, but twenty years ago it was thought to be and was something phenomenal. This train also made the longest run without a stop which has ever been made—from New York to Pittsburg, 440 miles. It is also notable as having been hauled from Ogden to Oakland, 881 miles, by one engine, in charge of the same engineer for that entire distance.

In 1888 regular trains were run between New York and Philadelphia at the rate of 42 miles an hour by the Philadelphia and Reading railroad, and 43.6 miles an hour by the Pennsylvania railroad. In August, 1896, the regular run on the Pennsylvania line was made at the rate of 48.6 miles per hour, while a special train made the run, Sept. 18, 1895, at the rate of 53.88 miles per hour. Very fast time is also made by Philadelphia and Reading trains between the same points, one of those trains having broken the speed-record in November, 1892, by covering a mile in 37 seconds, and 5 miles in 3 minutes and 25 seconds, the speed for the mile being at the rate of 97.3 miles an hour, and for the 5 miles an average of 82.95 miles per hour. The first remarkable speed-run of which there is a record was made in April, 1885, by a train on the Panhandle road (Pittsburg, Cincinnati, Chicago and St. Louis railroad), which was run from Pittsburg to Denison, 93 miles, at the rate of 55 miles an hour, and from Denison to Newcomerstown, 14 miles, at the rate of 72 miles an hour. In 1886 this record was broken by the Pennsylvania fast express from New York to Chicago, which made a part of the run at the rate of 75 miles an hour, averaging for the whole distance 38.5 miles an hour. In the same year a special train on the New York Central, carrying Wm. H. Vanderbilt, made a run of 81 miles in 61 minutes. On Dec. 1, 1889, a special train of two officers' coaches carrying officials of the Atchison system ran from Bakersfield, California, to Lathrop, 220 miles, in 222 minutes. The shortest time consumed for a single mile was 45 seconds, and a stretch of 10.5 miles was run in 8 minutes, or at the rate of about a mile in 45.7 seconds. Another remarkably fast run was made Nov. 19, 1889, on the Union Pacific railroad, from Green River, Wyoming, to Ogden, Utah, a section where grades are very difficult and the curves sharp and numerous. The 76 miles were covered in 65 minutes.

In 1891 the New York Central railroad began to make records for speed, and has continued steadily to improve on its performances until at the present time that company's famous engine No. 999 has the world's record for sustained speed. In September, 1891, the run from New York to Buffalo was made at the rate of 59.5 miles an hour, the 436.32 miles being covered in 440 minutes. On Nov. 8, 1892, on the same

road the Empire State Express, consisting of four cars, pulled by engine No. 893, was run from Syracuse to Albany, 115.76 miles, in 110 minutes, an average velocity of 63.14 miles an hour. The section from Syracuse to Utica, 52 miles, was covered at a speed averaging 67.38 miles an hour. On May 9, 1893, engine 999 on the New York Central ran a mile in 35 seconds and again in 32 seconds; and on May 19, 1893, the same engine ran 5 miles in 3 minutes, or at the rate of 100 miles an hour. The run from Syracuse to East Buffalo, 146 miles, was made in 135 minutes actual running-time, or at the rate of about 65 miles an hour. During the Columbian Exposition the run from New York to Chicago over the New York Central and the Lake Shore and Michigan Southern roads was made regularly in 20 hours, or at the rate of 48.2 miles an hour. At the present time the regular run from New York to Buffalo is made at the rate of 50.7 miles an hour, while the run from New York to Chicago was made by engine 999, drawing a train over the New York Central and Lake Shore roads, on Oct. 24, 1895, at the rate of 64.8 miles per hour, a portion of the distance being covered at the rate of 92.3 miles an hour. This is the fastest time for such a long distance that has ever been made.

The Knickerbocker Express of the Cleveland, Cincinnati, Chicago and St. Louis railroad, on Jan. 27, 1895, was run from DeGraff, Ohio, to Bellefontaine, on an ascending grade, at the rate of 55 miles an hour. On the Chicago, Burlington and Quincy road a train of five mail-cars and one express-car is run from Chicago to Union Pacific Transfer, 498.9 miles, at the rate of 43.8 miles an hour, the run from Chicago to Galesburg, 163 miles, being made at the rate of 49.7 miles an hour, or 51.9 miles, deducting stops. On April 21, 1895, a locomotive and one car carrying newspapers was run from Camden to Atlantic City, New Jersey, over the Pennsylvania railroad line, at an average rate of 76.46 miles per hour, and 25 miles of the run, from Winslow to Absecon, was made at the rate of 83 miles an hour. It is claimed for the Baltimore and Potomac, another Pennsylvania railroad line, that on Aug. 3, 1895, a train was run from Landover to Anacostia, District of Columbia, 5.1 miles in 3 minutes, or at the rate of 102 miles per hour. For distances over one thousand miles the best time is made on the Southern Pacific. The "Sunset, Limited" train on that road runs from New Orleans to San Francisco twice a week, making the run of 2,489 miles at the rate of 32 miles an hour. Another very fast long-distance run is made by an Atchison, Topeka and Santa Fé flyer, which covers the 2,265 miles between Chicago and Los Angeles at the rate of 30.5 miles an hour, such a train being run every day.

These high rates of speed were made possible by the adoption of compound locomotives. These engines have double cylinders for high and for low pressure, and are the most highly developed type of locomotive thus far produced. They burn anthracite coal, which is smokeless. A speed of one hundred miles an hour is developed daily by such engines on the New York Central, Pennsylvania, Lake Shore, Philadelphia and Reading and other first-class roads. The speed is so furious the engineer dare not put his head out of the cab for fear of being blinded and suffocated.

In Great Britain efforts have been made to excel the speed attained on the New York Central road. A special train was run over the West Coast line from London to Aberdeen, a distance of 539.75 miles on Aug. 22–23, 1895, at an average speed of 63.24 miles per hour elapsed time, and 63.93 miles per hour running-time. The train weighed 150,080 pounds. Inspired by that effort, a special train on the New York Central, weighing 361,000 pounds, ran from New York to Buffalo at an average speed of 63.54 miles an hour elapsed time, and 64.22 miles an hour, time in motion. And as supplementing this feat, the same engine made the run from Buffalo to Chicago at the rate of 63.61 miles an hour, elapsed time, and 65.07 miles an hour, time in motion.

POOLING. In America the earliest railroad pools were developed in New England, but they were on a moderate scale and attracted little attention. The first pool having an important history was the Chicago-Omaha pool, established in 1870. This was followed in December, 1872, by the first anthracite-coal combination; the year following, the pooling agreement entered into between the railroad and steamship lines of the South went into effect; the "cattle eveners' pool" was organized in 1875, the Southwestern Railway Association in 1876, the Trunk Line Commission and Central Traffic Association in 1877. At the time of the passage of the Interstate Commerce-Law most of the competing railroads of the country were banded together in one or another of a series of pooling associations.

Three forms of pooling have been practiced: anthracite-coal combinations, cattle and petroleum eveners' pools, and pools of general freight and passenger traffic. In the anthracite pool were the Philadelphia and Reading, Central of New Jersey, Delaware, Lackawanna and Western, Delaware and Hudson, Pennsylvania railroad and Pennsylvania Company. The chief objects in view were to maintain a remunerative price for anthracite coal, chiefly by restricting the output of that product, and to divide between the carriers the total amount of competitive traffic in accordance with agreed percentages. This agreement continued in force until August, 1876. On Jan. 1, 1878, a second combination went into effect, but it was dissolved at the close of the year, mainly because one of the parties to it refused to accept terms agreed upon by the others. During most of the years from 1878 to 1892 similar compacts were in force. The combination that attracted widest attention was the coal combination of 1892. In February of that year the Philadelphia and Reading leased the Lehigh Valley railroad and the Central Railroad of New Jersey, and made at the same time an agreement to buy the coal of their allied coal companies, the Lehigh Valley Coal Company and the Lehigh and Wilkesbarre Coal Company, and of the individual operators, at certain percentages of the prices that might be received for coal delivered at tide-water near New York. The plan covered practically the entire anthracite interest.

Suits were brought in Pennsylvania to annul the lease of the Lehigh Valley, and in New Jersey to annul the lease of the Central Railroad of New Jersey. In the latter case the chancellor of New Jersey decided against the lease in July, 1892, in consequence of which the road was surrendered to its owners in August. In Pennsylvania, on the other hand, the court, in December, 1892, decided in favor both of the lease of the Lehigh Valley and of the pooling agreement. In 1893 the contracts with the Lehigh and Wilkesbarre Coal Com-

pany and the Lehigh Valley lines were canceled, in obedience to orders of the New Jersey courts, and an order was issued by the chancellor perpetually enjoining those leases. Thus ended the celebrated coal combination of 1892.

The cattle eveners' pool was organized in 1875 to terminate a protracted struggle between the trunk lines from Chicago to Boston, New York, Philadelphia and Baltimore, which had frequently led to the transportation of live-stock at rates far below the actual cost. The plan involved an agreement between the rival companies to divide the traffic at a fixed percentage, and an engagement with an association of principal shippers to arrange their shipments so as to insure to each company its allotted share of the traffic. The shippers were, therefore, known as "eveners." In consideration of the services rendered by the eveners, they were allowed a rebate not only upon shipments made by themselves, but also upon all cattle shipped by other parties to other places east of Chicago. The scheme met with strenuous opposition, and was abandoned by the railroads in 1879. For petroleum the Standard Oil Company acted as evener under conditions similar to those described relating to live-stock traffic, and it received advantages in rates similar to those granted to the cattle eveners.

Other pools were devised to maintain rates on competitive traffic, in some cases by dividing the business between the railroads according to agreed percentages and in others by dividing the earnings from such business, the first method being known as a freight pool, the latter a "money" pool. The affairs of these pools were usually directed by a board consisting of a managing officer from each of the roads. There was also a commissioner appointed, whose duty it was to see to the enforcement of the agreement.

The earliest pool of this nature was made in 1870, between the Chicago and North-Western, the Chicago and Rock Island and the Chicago, Burlington and Quincy railroads, all three of which connected Chicago and Omaha. These railroads were of nearly equal length and financial resources, and their through business represented a large percentage of their total freight traffic, and produced an important share of their respective revenues. Accordingly, a pool was formed, and was continued without change for about fifteen years, when the expansion of these systems made new conditions. It passed through the Granger movement unshaken.

The competition in certain districts of the South had been even more reckless and ruinous than elsewhere. To avoid these evils, four railroads connecting Atlanta, Georgia, with the seaboard formed a pool in December, 1873; secured the co-operation of other lines, and established the Southern Railway and Steamship Association, affairs of which were directed by Albert Fink, vice-president of the Louisville and Nashville railroad. In three years this organization came to include practically all of the railroads south of the Potomac and Ohio rivers and east of the Mississippi, together with a large number of connecting or competing steamship lines. The objects of the association were achieved by fixing rates, arranging a basis of classification, and especially by the establishment, in 1875, of a clearing-house to settle through-traffic accounts.

The Southwestern Railway Association, organized in September, 1876, embraced the Chicago and Alton, the Chicago, Burlington and Quincy, the Chicago and Rock Island, the Hannibal and St. Joseph, the Kansas City, St. Joseph and Council Bluffs, the Missouri Pacific and the Wabash lines. Before it was formed the roads extending from Chicago, St. Louis and other Mississippi River points to Kansas City, Leavenworth, Atchison and St. Joseph engaged in frequent struggles for competitive traffic, disregarding their published tariffs and giving special rates to the injury of the public and themselves. Large shippers had contracts at half-rates, and a few secured them at still lower figures. None but the unwary paid tariff rates. The remedy proposed contemplated that each road should obtain such a percentage of the business as it was fair to presume it could secure if agreed rates were maintained by all routes.

In July, 1877, the Trunk Line Commission and Central Traffic Association were formed, these being, in the extent of mileage covered, the most important pooling agreements entered into up to that time. For a long time heavy trunk-line traffic was relatively unimportant, because of the lower cost of shipment by water, but the improvements of roadway, engines and cars and the growth of return or west-bound traffic made it possible for the railroads to compete for through traffic, which resulted in wars of rates. These wars on a large scale began in 1869, when the Pennsylvania and the New York Central had obtained control of Chicago connections.

In July, 1874, the New York Central, the Pennsylvania and the Erie roads and their western connections entered into an agreement at Saratoga to maintain rates. But owing to the recklessness of the Grand Trunk of Canada and the refusal of the Baltimore and Ohio to enter the pool, an extensive railroad war broke out in the spring of 1875, and continued until late in the next year. During its continuance first-class rates were quoted at 25 cents per hundred, fourth-class at 16 cents, while actual rates went much lower. Exhausted by this destructive contest, the companies in July, 1877, entered into agreements for the division of west-bound traffic, and two years later included the more complicated east-bound traffic. These agreements proved insufficiently comprehensive, and were broken and modified several times until 1884.

Meanwhile, the existence of these agreements led to the formation of three new competing lines. In 1882 the Chesapeake and Ohio connections were completed, and the Delaware, Lackawanna and Western extended its line by lease to Buffalo; while on Jan. 1, 1884, the West Shore route was opened between New York and Buffalo. The

usual rate war was precipitated by the entrance of these new competitors into the field, and it was fiercer than the contests which had preceded it. It was terminated by an agreement signed by eight competitive trunk lines east of the Alleghanies, Nov. 6, 1885. This new agreement differed from the old ones in the assumption of responsibility by the trunk lines for their western connections, which the next year entered into a similar compact, thus forming the Central Traffic Association, with a passenger committee, for the maintenance of fares.

The Southern Freight Association, formed December, 1885, covered all freight for which two or more of the associated roads might compete, passing through all points on or west or south of a line through Buffalo, Salamanca, Pittsburg, Wheeling, Parkersburg and Huntington. In the same month the railroads south of the Potomac and the Ohio and east of the Mississippi organized the Southern Passenger Committee to maintain suitable rates of fare.

On Dec. 19, 1885, in order to secure harmony and uniform rates, the Freight Traffic Association of the Middle States was formed. It comprised 37 railroads in the middle and more northern of the South Atlantic states, including all of the great trunk lines. Similar organizations for New England and the lines competing for traffic west of the Mississippi as far as the Pacific Coast were multiplied beyond convenient enumeration, when the Interstate Commerce Act was passed.

The Interstate Commerce Law went into effect April 1, 1887. Many railroad companies now sought to maintain rates by such adjustment of tariffs as would, in effect, produce apportionment of traffic among competing lines, and agreements containing provisions to this effect were from time to time filed with the Interstate Commerce Commission.

But while protesting their willingness to obey the law, many of the railroads continued practices for the prevention of which the law had been framed.

On Jan. 8, 1891, representatives of the Western roads in control of the trans-Mississippi traffic organized the Western Traffic Association, to maintain rates through the distribution of competitive traffic according to agreed percentages. The ground to be covered included all state and interstate freight and passenger traffic, competitive between any two or more of the members of the association, having origin or destination in Illinois, Minnesota, Wisconsin, upper Michigan, or any state or territory west of the Mississippi River, except business to and from trans-Pacific ports, Texas, Arkansas, Mexico, and the Indian Territory. On Oct. 11, 1892, the association was dissolved because certain of its members took undue advantage of others. That the law was being violated before and during the continuance of this agreement, was a general belief, but it was difficult to obtain evidence upon which to found charges. However, the Interstate Commerce Commission brought suit against the Trans-Missouri Freight Association and the 18 railroads constituting it, under the anti-trust law of March 2, 1890. The decision in the first instance and also on appeal in October, 1893, affirmed the legality of the association. Encouraged by this decision, new combinations, virtually founded on pooling contracts, were made, as by the Central Traffic Association, the Western Freight Association, the Southwestern Traffic Association, and the Trans-Missouri Association.

Meanwhile, public sentiment underwent a change as to evils of pooling. The law had not effected the good expected of it, but had really proven a failure from the outset. Complaints were heard that the system under it encouraged the discrimination between shippers, which the law was intended to prevent, and that it favored the restless and bargaining trader and the unscrupulous and reckless railway at the expense of the fair-minded shipper and honest railway official who aimed to comply with the provisions of the law. Measures to amend the law were brought forward in Congress, both in the Senate and in the House, the last proposal being in 1894, but no bill succeeded in passing both houses.

On Nov. 19, 1895, 31 leading railroad companies entered into an agreement that went into effect January, 1896, to co-operate with each other and adjacent transportation associations to maintain just rates, fares, rules and regulations on state and inter-state traffic, to prevent unjust discrimination and to secure reduction and concentration of agencies, and the introduction of economies in the conduct of the freight and passenger business. The association has jurisdiction over all competitive traffic (except coal, coke, iron-ore, mill-cinder, limestone and petroleum, and also all traffic destined to or coming from Florida, Georgia, North and South Carolina, Virginia and West Virginia, south of the south line of the Chesapeake and Ohio Railway) which passes to, from or through the western termini of the trunk lines, as now fixed or as they may be designed hereafter. On publication of this agreement suit was brought by the United States at the request of the Interstate Commerce Commission, praying for an injunction on the grounds that the agreement was in restraint of trade; an infraction of the anti-trust law of July, 1890, and contrary to the inter-state commerce law.

In March, 1896, representatives of railroad and steamship lines engaged in transcontinental traffic, formulated an agreement similar to that which existed up to Jan. 1, 1893, when the former transcontinental association was dissolved. It provides for a guarantee of $870,000 yearly, to be divided in the ratio of 45 to 55 between the Pacific Mail Steamship Company and Panama Railroad Company, and is sustained by roads having Pacific terminals.

On April 1, 1896, the Southwestern Association was reorganized, and an agreement adopted for the pooling of all Texas traffic from the seaboard north and northwest.

Electricity as a Motor. It is almost wholly since 1885 that attempts at applying the power of the electric current to the propulsion of railway cars have been made, and about five years later managers of street railways in general so far acknowledged the importance of the new form of traction as to give it a trial, and yet in a few years after animal traction was practically abandoned; the cable system is being rapidly superseded; steam dummy lines have gone the way of the horse road; the urban elevated railroads are pointing the same way, and even the standard railroads have been forced to adopt defensive measures against the encroachments and competition of the rapidly-expanding electric systems.

At first the trolley lines bid only for city and suburban passenger traffic, but in a short time they entered the field of inter-urban passenger traffic, with such success that they decided to compete for all local business. In pursuance of this policy they first secured contracts for carrying the United States mails; this was followed by making arrangements with the express companies for a share of that class of traffic, and now several of them have undertaken to compete for general freight business. The competition of electric with steam lines has made such inroads

into the earnings of the latter, that important companies, like the Pennsylvania, New York Central, and New York, New Haven and Hartford, have been forced to adopt it on certain of their branch lines, where it has given unqualified satisfaction.

Three methods of applying electricity are in use: the storage battery, the conduit system, and the widely-adopted overhead trolley. The trolley is only regarded as a makeshift, and the engineering problem of the day is the determination of a plan of electric propulsion for general use on railroads. Electric locomotives have been built, and others are under construction. Those in use on the Belt Line of the Baltimore and Ohio have developed enormous power, and maintained a rate of speed, so that locomotive-builders and manufacturers of electric motors have entered into compacts for the joint production of electric locomotives.

Elevated Street Railroads were first introduced into New York City; and an account of them is given in Vol. XX, p. 249.

The elevated-railroad system has been put in successful operation, first at Coney Island, where a line one mile long has been in operation since June, 1881; then in Brooklyn, in which two systems operate over 28.41 miles of streets; and finally in Chicago, where three companies operate lines aggregating 47.94 miles. Two of these Chicago railways, with 39.38 miles of line, are operated with electric power.

The cost of the New York system to June 30, 1895, amounted to $73,154,524, consisting of $52,085,339 for cost of road, $4,499,990 for equipment, $2,155,195 for real estate and buildings, the remaining $14,014,000 representing cost of leases. The cost per mile of road equaled $2,024,198. The mile of road at Coney Island cost $218,098. The Brooklyn system cost $42,436,831, or at the rate of $1,493,729 per mile. The two steam elevated railroads in operation in Chicago on June 30, 1895, together 14.94 miles long, cost $33,907,783, an average of $2,269,597 per mile. An electric elevated system, having 33 miles of line, was put in operation about June 1, 1895, the cost of which, as represented by its stock and bond issues, amounts to $42,000,000 or $1,272,727 per mile. The aggregate cost of elevated railroads in the United States is, therefore, $181,717,235. The average cost per mile amounts to $1,601,174 as compared with $87,809 per mile for street railroads and $54,844 per mile for standard steam railroads.

The system of elevated railroads has also been applied to trunk lines of railroad running through the business portions of populous cities, first in Philadelphia, then in Jersey City, and is now under consideration by the lines entering Chicago. Although the railroads oppose compulsory legislation on this point, it is admitted to be a great advantage to them in running their trains more rapidly and with less liability to serious accidents.

Public Service of Railways. In 1882 the number of passengers carried by railroads was 289,030,783; in 1895 the number was 543,974,263, an increase of nearly 90 per cent. In passenger movement, which means the total number of miles traveled by all passengers, the increase was from 7,483,059,934 in 1882 to 12,642,202,551 in 1895, an increase of about 70 per cent. It is a fact worthy of note that in 1895 the number of passengers carried and the number of miles they traveled was nearly equaled in 1890, and was very largely exceeded in all the years between 1890 and 1895.

In 1882 the average receipts per passenger per mile amounted to 2.50 cents, the average receipts per passenger to 65.09 cents, the average receipts per passenger-train mile to 113.72 cents, and the average receipts per mile of railroad to $1,964. In 1895 a considerable reduction is noticed, the average receipts per passenger per mile being 2.068 cents, the average receipts per passenger 48.10 cents, the average receipts per passenger-train mile 79.94 cents, the average receipts per mile of railroad being $1,460.

In 1882 the number of tons of freight moved was 360,490,375; in 1895 the number was 763,799,883, the increase within that period being 111.88 per cent. In freight movement the increase was from 39,302,209,249 in 1882 to 88,567,770,801 in 1895, an increase of 49,265,561,552 in the aggregate, or 125.35 per cent. The highest recorded number of tons carried in any year was in 1895, but in 1890 the figures of the later year were very nearly equaled, while the movement was 2,000,000,000 greater.

In 1882 the average receipts per ton per mile amounted to 1.236 cents, the average receipts per ton to 134.75 cents, the average receipts per freight-train mile to 159.21 cents, the average receipts per mile of railroad to $5,074. In 1895 the average receipts per ton per mile were 0.839 cents, the average receipts per ton 97.38 cents, the average receipts per freight-train mile 151.36 cents, and the average receipts per mile of railroad $4,151.

Character of Traffic. Full and accurate returns of the classification of freight traffic for the years covered by this article are not available, but in the following statement will be found the percentages for the years 1890 and 1895:

Description.	1890.	1895.
	Per cent.	Per cent.
Products of agriculture	13.75	12.20
Products of animals	4.79	4.46
Products of mines	49.05	50.32
Products of the forest	8.75	8.05
Manufactures	14.25	12.95
Merchandise	4.32	6.94
Miscellaneous	5.09	5.08

No details of passenger traffic whatever are available, for the reason that the data has never been collated. For the same reason it is impossible to present any correct figures as to the cost and profits of either passenger or freight traffic, this information being called for by no board of railroad commissioners in this country, except that of New York state; and in order to comply with this requirement, the railroads have been compelled to estimate the cost of conducting passenger and freight business on the erroneous basis of an apportionment of gross expenses to each class of traffic according to their train-mileage.

STATEMENT BY GROUPS OF FREIGHT CARRIED AND FREIGHT MOVEMENT OF THE RAILROADS OF THE UNITED STATES AT THE CLOSE OF THEIR FISCAL YEARS 1882 AND 1895.

GROUPS.	1882.		1895.	
	FREIGHT CARRIED.	FREIGHT MOVEMENT.	FREIGHT CARRIED.	FREIGHT MOVEMENT.
	Tons.	Miles.	Tons.	Miles.
New England states	28,605,416	1,680,009,065	42,183,249	3,374,290,496
Middle states	164,977,128	14,227,517,676	337,037,563	30,193,788,205
Central Northern states	112,994,545	15,518,010,669	223,734,762	28,714,735,510
South Atlantic states	11,150,122	1,152,261,588	45,800,646	6,216,071,981
Gulf and Mississippi Valley states	9,439,435	894,134,392	26,779,193	3,679,608,606
Southwestern states	13,828,827	2,113,863,778	43,655,714	7,285,185,949
Northwestern states	8,044,805	1,674,960,072	32,918,571	6,306,714,622
Pacific states	5,526,426	1,214,189,859	11,690,185	2,797,375,432

STATEMENT BY GROUPS OF FREIGHT EARNINGS, FREIGHT EARNINGS PER MILE, AND EARNINGS PER TON PER MILE OF THE RAILROADS OF THE UNITED STATES AT THE CLOSE OF THEIR FISCAL YEARS 1882 AND 1895.

GROUPS.	1882.			1895.		
	FREIGHT EARNINGS.	FREIGHT EARNINGS PER MILE.	EARNINGS PER TON PER MILE.	FREIGHT EARNINGS.	FREIGHT EARNINGS PER MILE.	EARNINGS PER TON PER MILE.
			Cents.			Cents.
New England states	$ 28,577,481	$4,616	1.70	$ 41,725,803	$5,453	1.24
Middle states	147,987,413	9,618	1.04	212,957,545	9,729	0.71
Central Northern states	159,148,556	4,649	1.03	214,422,454	3,990	0.74
South Atlantic states	19,775,267	2,424	1.71	49,054,174	2,400	0.79
Gulf and Mississippi Valley states	18,442,277	3,124	2.06	32,794,960	3,175	0.89
Southwestern states	40,742,313	2,918	1.93	90,416,124	2,848	1.24
Northwestern states	32,410,366	4,655	1.93	65,760,741	2,922	1.04
Pacific states	24,666,755	4,978	2.03	36,652,650	3,378	1.31

At the close of the tenth census year, 1880, the mileage and population of the eight geographical divisions of the country, with their relations to each other and to area, were as follows:

GROUPS.	POPULATION.	RAILROAD MILEAGE.	AREA, SQ. MILES.	POPULATION TO 1 MILE OF RAILROAD.	POPULATION TO SQ. MILE OF AREA.	AREA TO ONE MILE OF RAILROAD.
New England states	4,010,529	5,977	66,465	670.99	60.42	11.12
Middle states	11,756,053	15,181	116,530	774.39	100.88	7.67
Central Northern states	11,206,668	25,109	249,015	446.31	45.01	9.92
South Atlantic states	6,338,022	8,474	268,205	747.93	23.63	31.65
Gulf and Mississippi Valley states	6,525,097	6,995	230,230	932.82	27.04	32.91
Southwestern states	5,872,642	14,085	768,060	416.94	8.42	54.53
Northwestern states	3,052,915	12,347	609,315	247.25	5.01	49.35
Pacific states	1,393,857	5,128	717,060	271.81	1.94	139.83
United States	50,155,783	93,296	3,024,880	537.59	16.98	32.42

For the purpose of comparison a similar table, covering the statistics of 1895, is appended:

GROUPS.	POPULATION.	RAILROAD MILEAGE.	AREA, SQ. MILES.	POPULATION TO 1 MILE OF RAILROAD.	POPULATION TO SQ. MILE OF AREA.	AREA TO ONE MILE OF RAILROAD.
New England states	5,095,000	7,225	66,465	705.22	76.66	9.20
Middle states	15,660,000	21,705	116,530	721.50	134.39	5.37
Central Northern states	15,720,000	39,393	249,015	399.05	63.13	6.32
South Atlantic states	8,100,000	19,968	268,205	405.66	30.20	13.43
Gulf and Mississippi Valley states	8,110,000	14,442	230,230	561.55	35.23	15.94
Southwestern states	9,675,000	34,912	768,060	277.13	12.60	22.00
Northwestern states	5,600,000	29,465	609,315	190.09	9.19	20.68
Pacific states	2,625,000	13,911	717,060	188.70	3.66	51.55
United States	70,585,000	181,021	3,024,880	389.93	23.33	16.71

STATEMENT SHOWING NAME OF RAILROAD FIRST BUILT IN EACH STATE, TERMINI OF FIRST SECTION OPENED, LENGTH, DATE OPENED, AND TOTAL MILES OF RAILROAD IN EACH STATE IN 1880, 1890 AND 1900.

STATE.	NAME OF RAILROAD FIRST BUILT IN STATE.	TERMINI OF FIRST SECTION OPENED.		LENGTH OF PORTION IN STATE.	DATE OPENED.	TOTAL MILES, 1880.	TOTAL MILES, 1890.	TOTAL MILES, 1900.
		From	To	Miles.				
Maine	Bangor and Piscataquis R. R. and Canal	Bangor	Oldtown	11.00	1836	1,005	1,377.47	1,915.24
N. Hampshire	Nashua and Lowell	Nashua	Mass. State Line	6.22	1838	1,015	1,142.25	1,239.20
Vermont	Vermont Central	White River	Bethel	25.00	1848	914	991.42	1,012.11
Massachusetts	Granite (not incorporated)	Quincy	Neponset River	3.00	1827	----	----------	----------
Massachusetts	Boston and Lowell	Boston	Lowell	26.76	1835	1,915	2,096.69	2,118.58
Rhode Island	New York, Providence and Boston	Providence	Stonington	50.00	1837	210	217.43	211.79
Connecticut	----------	----------	----------	----	----	923	1,006.64	1,023.62
New York	Mohawk and Hudson	Albany	Schenectady	12.50	1831	5,991	7,745.85	8,121.03
New Jersey	Camden and Amboy	Bordentown	Hightstown	14.00	1832	1,684	2,099.86	2,256.69
Pennsylvania	Mauch Chunk & Summit Hill	Mauch Chunk	Summit Hill	9.00	1827	6,191	8,652.36	10,330.50
Delaware	Newcastle and Frenchtown	Newcastle	Frenchtown	16.19	1832	275	314.95	346.72
Maryland	Baltimore and Ohio	Baltimore	Ellicott's Mills	15.00	1830	1,019	1,270.04	1,376.16
Dist. of Col'bia	Washington Branch R. R	Relay House, Md.	Washington, D. C.	4.00	1835	21	20.66	31.75
Ohio	Mad River and Lake Erie	Sandusky	Green Spring	22.50	1838	5,792	7,980.49	8,807.27
Michigan	Erie and Kalamazoo	Toledo, O	Adrian, Mich	33.00	1836	3,938	7,108.48	8,195.18
Indiana	Madison and Indianapolis	Madison	Vernon	22.00	1842	4,373	6,109.19	6,470.61
Illinois	Northern Cross	Jacksonville	Meredosia	24.00	1839	7,851	10,115.90	11,002.93
Wisconsin	Milwaukee and Waukesha	Milwaukee	Waukesha	21.50	1851	3,155	5,612.62	6,530.52
Virginia	Chesterfield	Richmond	Chesterfield Mines	13.00	1831	1,893	3,359.65	3,779.15
West Virginia	Baltimore and Ohio	Harper's Ferry	Opposite Hancock	39.00	1842	691	1,433.30	2,228.05
North Carolina	Petersburg	Petersburg, Va.	Blakely, N. C.	63.00	1833	1,486	3,128.17	3,831.16
South Carolina	South Carolina Canal & R.R.	Charleston	West	7.00	1830	1,427	2,289.15	2,817.93
Georgia	Central	Savannah	West	9.00	1837	2,459	4,600.80	5,651.72
Florida	St. Joseph and Iola	St. Joseph	Lake Wimico	8.00	1836	518	2,489.52	3,299.06
Alabama	Tuscumbia and Decatur	Tuscumbia	Decatur	45.50	1834	1,843	3,422.20	4,225.84
Mississippi	Vicksburg and Jackson	Vicksburg	Jackson	14.00	1841	1,127	2,470.85	2,919.90
Tennessee	Nashville and Chattanooga	Nashville	Murfreesboro	30.00	1851	1,843	2,767.38	3,136.95
Kentucky	Lexington and Ohio	Lexington	Frankfort	29.00	1835	1,530	2,942.38	3,059.99
Louisiana	Lake Ponchartrain	New Orleans	L. Ponchartrain	5.00	1831	652	1,739.85	2,824.08
Missouri	Pacific	St. Louis	West	6.00	1852	3,965	6,142.02	6,875.04
Arkansas	Memphis and Little Rock	Memphis	West	5.00	1857	859	2,203.44	3,359.86
Texas	Buffalo Bayou, Brazos and Colorado	Harrisburg	Richmond	32.00	1854	3,244	8,709.85	9,986.49
Kansas	Union Pacific—Eastern Div.	Kansas City	Lawrence	40.00	1864	3,400	8,892.11	8,719.36
Colorado	Kansas Pacific	Sheridan, Kan	Kit Carson	87.00	1870	1,750	4,291.11	4,587.25
New Mexico	New Mexico & South Pacific	Colo. State Line	South	8.30	1878	758	1,388.77	1,752.52
Indian Ter	Atlantic and Pacific	Seneca	Vinita	35.50	1870	289	954.84	1,322.75
Oklahoma	Atchison, Topeka & Santa Fé	Ark. City, Kan.	Ponca	25.00	1886	----	305.81	827.88
Iowa	Mississippi and Missouri	Davenport	Muscatine	39.00	1855	5,400	8,416.13	9,185.18
Minnesota	St. Paul and Pacific	St. Paul	St. Anthony	10.00	1862	3,151	5,545.35	6,942.57
Nebraska	Union Pacific	Omaha	West	40.00	1864	1,953	5,407.47	5,684.85
North Dakota	Northern Pacific	Fargo	Bismarck	196.50	1873	1,225	2,116.49	2,731.22
South Dakota	Dakota and Northwestern	Big Sioux River	Yankton	60.00	1873		2,610.41	2,849.83
Wyoming	Denver Pacific	Denver, Col.	Cheyenne	106.00	1870	512	1,002.93	1,228.63
Montana	Utah and Northern	Ogden, Utah	Blackfoot	160.00	1869	106	2,195.58	3,010.32
California	Sacramento Valley	Sacramento	Folsom	22.50	1856	2,195	4,328.03	5,751.04
Washington	Dalles and Des Chutes	Lower Cascade	Upper Cascade	6.00	1862	289	2,012.05	2,913.57
Oregon	Oregon and California	Portland	Albany	80.00	1870	508	1,439.97	1,723.80
Nevada	Central Pacific	Truckee, Cal.	Reno	35.00	1868	739	923.18	909.35
Arizona	Southern Pacific of Arizona	Yuma	Adonde	30.00	1879	349	1,094.81	1,511.89
Utah	Union Pacific	Evanston, Wyo.	Echo	36.00	1869	842	1,265.49	1,547.42
Idaho	Utah Northern	Brigham, Utah	Franklin	61.00	1874	206	946.11	1,261.23

Massachusetts. The first railroad built in Massachusetts was the Granite Branch, but the first regularly incorporated road was the Boston and Lowell.

Connecticut. The New York, Providence and Boston was the first railroad opened in Connecticut, as it was also the first in Rhode Island. It was opened Nov. 10, 1837. The Hartford and New Haven, begun in 1836 from Hartford to New Haven, and about one half of the line (18 miles), was opened in 1838, the whole 36.25 miles being opened in 1839. In 1900, the grand total of railway mileage in the U. S. was 193,345 miles.

STATEMENT SHOWING NAME OF RAILROAD FIRST BUILT IN EACH GROUP, TERMINI OF FIRST SECTION OPENED, LENGTH, DATE OPENED, AND TOTAL MILES OF RAILROAD IN EACH GROUP IN 1880, 1890 AND 1895.

GROUP.	NAME OF RAILROAD FIRST BUILT IN GROUP.	TERMINI OF FIRST SECTION OPENED.		LENGTH.	DATE OPENED.	TOTAL MILES, 1880.	TOTAL MILES, 1890.	TOTAL MILES, 1895.
		From	To					
				Miles.				
New England	Granite (not incorporated)	Quincy, Mass	Neponset Riv., Mass.	3.00	1827	5,977	6,831.90	7,224.65
Middle Atlantic	Mauch Ch'k & Summit Hill	Mauch Ch'k, Pa.	Summit Hill, Pa	9.00	1827	15,181	20,103.72	21,704.73
Cent. Northern	Erie & Kalamazoo	Toledo, O	Adrian, Mich	33.00	1836	25,109	36,926.68	39,393.52
South Atlantic	S. Carolina Canal & R. R	Charleston, S.C.	West	7.00	1830	8,474	17,300.59	19,967.63
Gulf & Miss. Val.	Lake Pontchartrain	N. Orleans, La.	L. Ponchartrain, La.	5.00	1831	6,995	13,342.66	14,442.13
Southwestern	Pacific	St. Louis, Mo	West	6.00	1852	14,085	32,887.95	34,912.04
Northwestern	Mississippi & Missouri	Davenport, Ia	Muscatine, Ia	39.00	1855	12,347	27,294.36	29,465.06
Pacific	Sacramento Valley	Sacram'nto, Cal.	Folsom, Cal	22.50	1856	5,128	12,009.64	13,911.16
United States						93,296	166,697.50	181,020.92

STATEMENT SHOWING FOR ALL THE RAILROADS IN THE UNITED STATES THEIR MILEAGE, CAPITALIZATION, EARNINGS, EXPENSES, INCOME, ETC., AT THE CLOSE OF THEIR RESPECTIVE FISCAL YEARS ENDING IN 1880 AND 1895, WITH THE INCREASE AND RATE OF INCREASE WITHIN THE 15-YEAR PERIOD.

	1880.	1895.	INCREASE.	RATE INCREASE.
				Per Cent.
Miles of railroad owned	92,147	179,887	87,740	95.21
Capital stock	$2,708,673,375	$5,231,373,552	$2,522,700,477	93.13
Bonded debt	2,530,874,943	5,712,052,517	3,181,177,574	125.69
Other debt	162,489,939	419,558,711	257,068,772	170.51
Total	$5,402,038,257	$11,362,985,080	$5,960,946,823	$110.35
Miles of railroad operated	82,146	179,228	97,082	118.18
Earnings from freight	$464,748,928	$743,784,451	$279,035,523	60.04
Earnings from passengers	146,153,003	261,640,598	115,487,595	72.17
Miscellaneous earnings	2,831,679	99,859,218	97,027,539	*3,426.52
Total gross earnings	$613,733,610	$1,105,284,267	$491,550,657	80.09
Operating expenses	358,176,055	777,778,551	419,602,496	117.15
Net earnings	$255,557,555	$327,505,716	$ 71,948,161	28.15
Interest on bonds	107,866,328	242,943,243	135,076,915	125.23
Dividends paid	77,115,371	83,175,774	6,060,403	7.86

*The extraordinary increase in miscellaneous earnings is due to elevated railroads being brought into operation during the period.

STATEMENT SHOWING THE GROSS AND NET EARNINGS AND INTEREST AND DIVIDENDS PAID BY ALL THE RAILROAD COMPANIES OF THE UNITED STATES FOR THEIR RESPECTIVE FISCAL YEARS FROM 1880 TO 1900, BOTH INCLUSIVE.

YEARS.	GROSS EARNINGS.	NET EARNINGS.	INTEREST PAID.		DIVIDENDS PAID.	
			Per Cent.	Amount.	Per Cent.	Amount.
1880	$ 613,733,610	$255,557,555*	4.26	$107,866,328	2.85	$ 77,115,371
1881	701,780,982	272,406,787	4.47	128,587,302	2.94	93,344,190
1882	770,209,889	280,316,696	4.77	154,295,380	2.91	102,031,434
1883	823,772,924	298,367,285	4.95	173,139,064	2.75	102,052,548
1884	777,396,317	270,890,951	4.66	178,058,382	2.48	94,414,835
1885	772,968,833	269,493,931	4.77	187,426,035	2.02	77,672,105
1886	829,940,836	300,603,564	4.75	189,036,304	2.04	81,654,138
1887	940,150,702	334,989,119	4.71	203,790,352	2.18	91,573,458
1888	960,256,270	301,631,051	4.35	207,124,288	1.77	80,243,041
1889	1,002,926,059	322,122,721	4.40	218,974,214	1.81	81,262,523
1890	1,097,847,428	346,921,318	4.27	226,799,682	1.80	85,075,705
1891	1,138,024,459	356,209,880	4.25	231,259,810	1.85	90,719,757
1892	1,204,915,204	358,638,520	4.25	232,659,089	1.93	95,662,412
1893	1,222,618,290	364,591,109	4.30	239,616,284	1.86	95,337,681
1894	1,080,305,015	322,539,276	4.11	237,620,367	1.64	85,278,669
1900	1,501,695,378	483,247,526	4.25	244,447,806	1.59	140,343,653

FINANCIERING. During the period from 1880 to 1884 there was an immense and unwarranted inflation in capitalization of lines of railroad. In the six years, 1879 to 1884, inclusive, there were listed on the New York Stock Exchange stocks and bonds of railroads aggregating $3,361,017,293, as follows:

In 1879	$698,074,074
In 1880	600,270,885
In 1881	763,880,151
In 1882	411,029,325
In 1883	617,507,884
In 1884	270,254,974
Total	$3,361,017,293

This statement shows the vast magnitude of the operations of the country in railways in the period from 1880 to 1884. A portion of these listings were the stocks and bonds of reorganized companies, such as Erie, Wabash and others, and were so far relistings under new names and forms.

That vast amounts of fictitious capital were floated during this period is well known and universally acknowledged. Its effect was to precipitate the panic of 1884, in reference to which Poor's Manual for 1885 says:

"Of the 40,000 miles of line built in the five years ending with 1883, no small part was built on speculation, and for that very reason, paralleled already existing lines. The most striking examples of the kind . . . are the West Shore and 'Nickel-Plate' lines. The general demoralization which has prevailed in railroad circles is due more to the construction of these two and to the ill-fortune which attended them than to any other cause, or it may be said, to all other causes. The effect has been to stop altogether the payment of dividends, which had been paid for a long time at high rates, by the Lake Shore and Michigan Central, and to reduce those paid on the New York Central from two per cent quarterly to one-half one per cent quarterly. The stoppage or reduction of dividends on these great lines created profound apprehension and distrust as to the value of all railroad properties. The earnings of other great trunk lines suffered in like manner if not to the same extent. A general disruption of the relations previously existing between the companies was the inevitable result. They seemed to be set wholly adrift without chart or compass. In the distrust and incoherency which prevailed, the various lines, especially the great trunk lines, struck out on their own account and bid wildly for business with very little reference to rates or to the result. Pools were dissolved almost as soon as they were entered into, as they always will be dissolved whenever there is not enough business to go round."

"Although West Shore and 'Nickel-Plate' seemed to be the occasion of the great catastrophe of 1883 and 1884, the real causes had been long at work in the wonderful success of signal instances of 'watering.' The real catastrophe occurred when these waterings took place. Incited by their success, our whole people became wild upon the subject of railroad construction, believing that two or three dollars could easily be made for every dollar put up, either by the success of their ventures or by the sale of their securities. In this mania or delusion the capitalist and adventurer alike shared. The promoters of West Shore, men of capital, put up their money in good earnest under the idea that they were embarking in an honorable and meritorious enterprise. The promoters of 'Nickel-Plate' built their line on speculation and for the purpose of selling it, securities being issued at the rate of two or three dollars for every dollar of cash paid. No small portion of the 40,000 miles constructed in the five years ending with 1883 was built upon the same plan and with the same object. Whatever their fate, a large number of them became competitors for a business for which ample provision had already been made by existing lines. Railroads, unfortunately, seem to reverse the rule of 'the survival of the fittest' to 'the survival of the unfittest.' They can be used but for one purpose, and when they go into the hands of receivers they are to be run so long as the operating expenses can be paid. If the earnings are not sufficient for this purpose they are to be eked out by 'receiver's certificates.'"

The extent of "water" in the share capital of the railroads is hard to determine. Of the total share capital, $5,231,373,852, more than $1,250,000,000 is duplicated. The duplication arises in this way: The capital stock of the St. Louis, Iron Mountain and Southern Railroad Company amounts to $25,763,950, but this is owned by the Missouri Pacific Railroad Company, which in 1881 issued its own stock in the proportion of three shares for four in exchange for the Iron Mountain stock and carries the latter among its treasury assets. But as each company is still a separate corporation the capital of each is included in the summaries each year and there is in consequence a duplication to the extent of the increase in Missouri Pacific stock.

The elimination of this duplicated share capital would leave the "live" stock outstanding say $4,000,000,000, of which about $750,000,000 is preferred and $3,250,000,000 common stock.

In almost a corresponding manner there have arisen duplications in the funded debts of the railroad companies through the issuance of collateral trust bonds secured by a deposit of bonds of subsidiary roads as security for bonds of the parent organization. In such cases each issue of bonds appears in the balance-sheets of the respective companies as liabilities, and are in consequence included in the general summaries of all the roads.

Estimating the aggregate amount of collateral trust bonds in existence and other bonds in the companies' treasuries at $7,000,000,000, the net bonded debt of all the roads would be reduced to say $5,000,000,000.

With these changes the capitalization of the railroads may be summarized as follows:

Capital stock, common	$3,250,000,000	
Capital stock, preferred	750,000,000	$4,000,000,000
Bonded debt, mortgage bonds	4,300,000,000	
Incomes and other	700,000,000	5,000,000,000
Total stock and bonds, less duplications		$9,000,000,000

Of the common stock, vast sums have only a nominal value, such as the stock of the West Shore Railroad Company. How much of the remainder was issued without cash consideration it is impossible to ascertain, but it is within the bounds of safety to say that of the $3,250,000,000 stock now outstanding not more than $1,250,000,000 is full paid stock. This item of so-called "watered" stock is the rock upon which the railroad interest of this country has frequently struck.

In 1896, 63.6 per cent of the stock failed to pay any dividends, the dividends paid on the remaining 36.4 per cent averaging only 1.83 per cent on the whole amount of stock, and 5.04 per cent on the stock earning those dividends.

COMPARATIVE STATEMENT showing the amounts of capital stock upon which dividends were paid in 1882, and from 1886 to 1895 inclusive; the amounts upon which no dividends were paid; the relative percentages of such amounts, and the percentage of dividend payments to all stock and to that on which they were paid; also the amount of bonds on which interest was paid or charged against revenue during the same period, the "unproductive bonds" representing the amount of income bonds and bonds of a similar character on which no interest was paid; and those of new lines under construction at the close of each fiscal year, etc., etc.:

UNITED STATES.	CAPITAL STOCK.			PER CENT.		DIVIDENDS.			BONDED DEBT.			PER CENT.		INTEREST.		
	Productive.	Non-Productive.	Total.	Productive Stock.	Non-Productive.	Dividends Paid.	Per Cent. Total Stock.	Per Cent. Productive.	Amount on which Interest was Paid or Charged.	Amount of Non-Productive Bonds.	Total.	Productive Bonds.	Non-Productive.	Interest Paid.	Per Cent. Total Bds.	Per Cent. Productive.
1882	1,673,790,859	1,805,170,387	3,478,961,246	48.11	51.89	101,967,560	2.93	6.10	2,770,707,249	419,707,952	3,190,415,201	86.84	13.16	150,232,255	4.71	5.42
1886	1,675,669,744	2,325,694,754	4,001,364,498	41.88	58.12	81,654,138	2.04	4.87	3,460,702,252	422,700,078	3,883,402,330	89.12	10.88	189,036,304	4.52	5.08
1887	1,805,487,881	2,386,074,148	4,191,562,029	43.07	56.93	91,573,458	2.18	5.07	3,624,051,695	562,891,421	4,186,943,116	86.56	13.44	203,790,352	4.67	5.39
1888	1,769,773,189	2,668,638,153	4,438,411,342	39.87	60.13	80,243,041	1.81	4.54	4,124,501,052	499,533,971	4,624,035,023	89.20	10.80	207,124,288	4.30	4.83
1889	1,790,842,473	2,704,256,845	4,495,099,318	39.84	60.16	81,262,523	1.81	4.54	4,218,312,265	610,053,506	4,828,365,771	87.37	12.63	218,974,214	4.35	4.98
1890	1,688,076,918	2,952,162,660	4,640,239,578	36.38	63.62	85,075,705	1.83	5.04	4,628,133,541	477,768,484	5,105,902,025	90.64	9.36	226,799,682	4.31	4.76
1891	2,046,060,711	2,763,115,940	4,809,176,651	42.54	57.46	90,719,757	1.89	4.43	4,721,057,192	514,237,882	5,235,295,074	90.18	9.82	231,259,810	4.30	4.77
1892	2,174,718,238	2,745,836,987	4,920,555,225	44.20	55.80	95,662,412	1.94	4.40	4,963,062,906	500,548,298	5,463,611,204	90.84	9.16	232,659,089	4.25	4.69
1893	1,995,402,586	3,084,630,318	5,080,032,904	39.28	60.72	95,337,681	1.88	4.84	5,124,056,502	446,236,111	5,570,292,613	91.99	8.01	240,538,207	4.32	4.69
1894	1,777,363,667	3,298,265,403	5,075,629,070	35.02	64.98	85,278,669	1.66	4.80	5,028,849,447	636,884,802	5,665,734,249	88.76	11.23	237,731,567	4.20	4.73
1895	1,818,819,436	3,412,554,416	5,231,373,852	34.77	65.23	83,175,774	1.59	4.57	5,260,903,441	451,149,076	5,712,052,517	98.10	7.90	242,943,243	4.25	4.61

See also INTERSTATE COMMERCE LAWS and PACIFIC RAILROADS, in these Supplements, and RAILWAY, Vol. XX, pp. 264, 265. JOHN P. MEANY.

RAILWAYS, ELECTRIC STREET. There are two general methods of using electricity for the propulsion of street cars:

1. The direct method, by conductors extending from the dynamo along the track.

2. The indirect method, by the use of storage batteries, secondary batteries, or accumulators.

In the direct method the conductors may be overhead, underground, or on the surface.

In the conduit system the conductors are placed in a conduit between the rails or between the tracks. The wires must be bare and yet must be thoroughly insulated from the ground, a condition very difficult to obtain under such circumstances. A slot about five-eighths of an inch wide gives access to the conductors by means of a contact plow, but unfortunately also permits the flow of water, slush, mud, etc., into the conduit.

The overhead wire is suspended from poles by brackets or from cross-wires which span the street between poles on either side. When the street is of sufficient width, poles are placed in the center of the street between the two tracks, with bracket-arms carrying the conducting-wires. These poles are placed about 125 feet apart, and from actual experience are found to present little or no obstruction to traffic. The wires may be single or double. When single wire is used, the rails are utilized for the return current. When two wires are used, one wire carries the outgoing and one the return current. Contact is obtained with the wire by an over-running or an under-running trolley. The over-running trolley is a light carriage with one or more wheels resting on the wire.

A flexible conductor carries the current down to the car. The trolley is pulled along by the flexible conductor. The objections to the over-running trolley are, that it is difficult to keep the trolley on the wire, it is difficult to replace the trolley when it comes off, and any automatic system of switching on to a turnout, branch or Y is impossible. The latter is such a serious objection that except in special cases the over-running trolley will never be used. In the under-running trolley a light arm of the requisite length is mounted on the top of the car, reaching up to the wire. A wheel on the end of the arm is pressed up against the wire by means of springs at the other end, and the current is carried from the wheel down through the arm itself if made of metal, or through wires if the arm is made of wood. This arm is usually called the contact-bar. The under-running trolley is automatic in its action at curves, turnouts, etc., and follows the direction of the car. It turns on a swivel through the entire circle, and moves through an arc of 90° in a vertical direction. (See TROLLEY ROADS, in these Supplements.)

In the storage system, a battery of about 120 cells is carried on the car, and the motors are driven by the current from this battery. The advantages of this system are: The cars can run on any track; no wires, either overhead or underground, are required; each car is more independent than is the case in other systems.

The disadvantages are:

1. The extra weight of about two tons on each car; the power required to carry this dead weight in addition to that required to drive cars required by the other methods.

2. The lack of efficiency in the batteries. The highest efficiency claimed is 82 per cent. The actual practical efficiency is stated by many authorities as about 70 per cent.

3. Storage cars cannot be regularly operated on grades exceeding five per cent or six per cent. The power required on grades makes too great a demand on the batteries.

4. The expense. The cost of two sets of batteries per car is about $3,000.

5. The cost of maintenance. Batteries have not yet been made of sufficient durability to be operated economically. (See under *Secondary Cells*, ELECTRICITY, §109, in these Supplements.)

EFFICIENCY. The steam-engine is not an efficient machine. If we can utilize 15 per cent of the units of energy stored in the coal, we are fortunate. In

other words, we must expect a loss of 85 per cent of the heat-units in converting the other 15 per cent into mechanical power.

The dynamo electric machine, on the other hand, possesses a high degree of efficiency. No good generator runs below 92 per cent efficiency. The loss in the line depends upon the amount of copper used in proportion to the current to be carried. The size of the conductor is generally calculated for a loss of 10 per cent. The efficiency of the motor under favorable circumstances has been shown to be but little below the generator, in actual tests running as high as 91½ per cent.

In practice it would not probably be taken higher than 35 per cent. Starting, then, with 100 horse-power in the steam-engine, we lose 8 per cent in the dynamo in converting the mechanical into electrical energy. The output of the generator is then 92 horse-power. In the line we lose 10 per cent, and deliver 82.8 horse-power to the motor. Here we lose 15 per cent, and on the final reconversion into mechanical energy on the car we have 70.4 horse-power out of the original 100 horse-power. By no other known method could this power be transported to such a distance with so little loss.

Economy. This is a quality that appeals more directly to the railway official than others. An electric railway connects Omaha with Council Bluffs across the new bridge. To run twenty cars per day they consume five tons of slack, for which they pay $1.14 per ton. This is 28½ cents per day for fuel. These cars are scheduled at 15 miles per hour, and the average daily mileage per car is over 100 miles. Where natural gas or water is available, fuel may be even cheaper. On many different roads, from numerous measurements it has been found that where the grades are slight the power required averages from five to eight horse-power per car. The consumption of fuel varies from three to six pounds of coal per horse-power, according to the style of engine and its more or less economical operation.

On some roads, under very favorable conditions, the cost of renewals and repairs to electrical apparatus has been but a little below one dollar per day per car in actual operation. On other roads, under very favorable conditions, the cost of maintenance has been less than 25 cents per day per car.

A mean of the reports obtained from 11 roads in actual operation under different conditions shows a daily cost of operation of less than $2.50 per day, not including drivers and conductors.

The objections urged against the overhead wires are: They are dangerous, as they carry death-dealing currents; they are in the way in case of fires.

The railway wire should not be confounded with other electric wires. Arc and incandescent wires, telegraph and telephone wires, have simply to carry the current from the point where it is generated to the point where it is to be used, and so far as this purpose is concerned they may be above-ground or under-ground. The railway wire, on the other hand, must have current taken from it every differential of an inch from one end to the other. The wire must be bare, that the trolley-wheel may be in constant contact. To put this wire under-ground and to keep it properly insulated is a very different problem from burying the other wires. Now, as to danger. For railway work we use a constant potential generator, and the cars and motors are placed between the two conductors on the multiple-arc system. One conductor, the overhead wire, runs out from one pole of the generator; the other conductor, the rail, runs out from the other pole of the generator. An electrical connection between these two conductors completes the circuit, and the current flows through the connecting material, whatever it may be. If it be the motors on the car, then the cars move; if it be a man, he receives a shock.

Each connecting material, be it car, man or wire, receives a current of electricity which is determined by Ohm's law that the current is equal to the electro-motive force or pressure divided by the resistance. The electro-motive force is always 500 volts. With several cars in operation the amperes of current in the overhead system near the generator may run as high as 180, but each car takes its own proportion according to its resistance. The average resistance of a man is 4,000 ohms. If he places himself in the circuit he will receive a current which is measured in amperes by dividing 500 by 4,000, or, in other words, a 500-volt current can only drive ⅛ of an ampere through the average human body. It would not make a particle of difference to the man whether the overhead wire he touched was carrying a current of 1 ampere or 180 amperes, or 180,000 amperes. The effect in his case would be the same: he would receive one eighth of an ampere. Were this not true, then the whole multiple-arc theory would be false, and electric railways, as at present operated, would be impossibilities. It would then make no difference as to danger whether one or a million cars were in operation on the line.

The current for railway work has been fixed at 500 volts, as this is well within the safe limits. A shock from 500 volts is unpleasant, but not dangerous. If there were any real question of its being dangerous, then 400 volts or 300 volts would be used. The objection to this, however, is, that by reducing the voltage we must correspondingly increase the quantity in order to retain the same horse-power, and an increase in quantity (amperes) means an increase in the size of the overhead wires, which is objectionable. The danger-limit with the electric current is probably about 1,000 to 1,200 volts.

Every overhead wire is objectionable to the fire commissioners; the railway wire is less objectionable than any other, because there is but one wire, and this wire is in the middle of the street, away from the buildings.

If the single overhead working conductor is insufficient to carry the current necessary to operate the cars, it must be re-enforced by feeder-wires. These feeder-wires may be insulated and may be placed underground. The overhead wire may be divided into sections of three, four, six or one thousand feet in length. At the ends of each section a cut-out or switch may be placed on the pole like a fire-alarm box, so that in case of fire the current may be cut out of the section or sections in the vicinity of the

fire. The firemen would then have no difficulty in handling the wires, which in any event are easily cut by pliers with insulated handles. But it may further be considered whether the overhead wire may not be made an aid to the fire department. As Professor Thomson remarked to the insurance representative: "It will not be long before you will be taking power from these wires to put out your fires. It will not be long before we have electric motor fire-engines."

RAILWAY UNION, American. See Labor Organizations, in these Supplements.

RAIMOND, C. E. See Robins, Elizabeth, Vol. XXVIII, p. 601.

RAIMONDI, Antonio, a Peruvian historian. See Peru, Vol. XVIII, p. 693.

RAIMONDI, Marc Antonio. See Marc-antonio, Vol. XV, pp. 538, 539.

RAIN. See Geology, Vol. X, pp. 237–39.

RAINBOW. See Light, Vol. XIV, pp. 600–602.

RAINES, John, an American lawyer and public man; born in Canandaigua, New York, May 6, 1840. He graduated from the Albany Law School in 1861; served in the armies of the Potomac and North Carolina as captain from 1861 to 1863; was a member of the assembly of the state of New York in 1881, 1882 and 1885; was state senator in 1886, 1887, 1888 and 1889; was president of the board of education of Canandaigua; was elected to Congress in 1889 and re-elected in 1891. He was the author of the Raines Liquor Law; q.v., under Liquor Laws in the United States, in these Supplements.

RAINES LAW. See Liquor Laws, in these Supplements.

RAINFALL. See Meteorology, Vol. XVI, pp. 132, 133; and in these Supplements.

RAINIER, Mount. See United States, Vol. XXIII, pp. 846, 848.

RAINY, Robert, a Scottish ecclesiastic; born in Glasgow, Jan. 1, 1826, and educated at the university there, graduating in 1843; studied theology at New College from 1844 to 1848; ordained minister of the Free Church in 1851; became professor of church history in New College in 1862, and in 1874 its principal. He was a prominent leader of the Free Church and an advocate of disestablishment. He wrote several theological works; among them, *Three Lectures on the Church of Scotland* (1872); *The Delivery and Development of Christian Doctrine* (1874); *The Bible and Criticism* (1878); and *The Epistle to the Philippians* (1892).

RAINY LAKE, a lake which forms a portion of the boundary line between British North America and the United States. It is situated 160 miles W. of Lake Superior; is 1,160 feet above sea-level, and is about 35 miles long and 5 miles in average breadth. Its surplus waters are carried off to the Lake of the Woods, in a west-northwesterly direction, by the Rainy River, which is about 100 miles in length, and the banks of which are covered with pine forests. It is dotted with numerous small islands, and its waters abound in fish.

RAINY LAKE CITY, a small town on Rainy Lake River, in the extreme northwest portion of Ontario, founded in 1894. In the following two years this place came into notice on account of the reported discovery of gold. So far, no paying ore has been taken from this region, but the excitement has been sufficient to bring many people into the locality, and several small villages and hamlets have sprung up on both the American and Canadian side of Rainy Lake. Population 1900, about 1,600.

RALE, Sébastien, a French missionary; born in Franche-Comté, in 1657. He became a Jesuit and professor of Greek at Nîmes; went to Canada, arriving at Quebec, Oct. 13, 1689, and was stationed among the Abenaki and the Algonquin Indians, near the Falls of the Chaudière, learning their languages and customs; in 1692, went to Illinois; in 1694, took charge of the Abenaki mission at Norridgewock, on the Kennebec, and built a church. The Indians, incited by Frontenac and the French Jesuits, broke their treaty engagements with the British colonists. The English settlers laid the blame of their troubles with the Indians to Rale, and set a price on his head. They burned his church in 1705, and again in 1722 pillaged his house and carried away his dictionary of the Abenaki language, which they presented to Harvard College, and finally, in a third expedition in 1724, succeeded in killing him. In 1833 a monument was erected to his memory at Norridgewock. His Abenaki dictionary was published in 1833, and a memoir of him appeared in Sparks's *American Biography*.

RALEIGH, capital city of the state of North Carolina, and county seat of Wake County, is situated on the Neuse River, 133 miles N.N.W. of Wilmington and 157 miles by rail S.S.W. of Richmond, Va. The city stands on elevated ground, and is regularly built, having a central Union Square, from which radiate four principal streets, each 99 feet wide. This square contains the state capitol, a large and handsome domed building of granite, which cost over $700,000. There are various other state buildings, including institutions for the blind, the deaf and dumb, and the insane, a penitentiary, the governor's mansion, and a museum of geology. It has also a United States Government building, a county court house, Shaw University (colored), etc., also various manufactories, including iron and car works, and cotton, carriage, and agricultural implement factories. It was settled in 1792, and in 1900 had a population of 13,643. G.J.H.

RALLIDÆ, a family. See Rail, Vol. XX, pp. 229, 230.

RALSTON, William Ralston Shedden, author; born in England in 1828. After receiving his education he turned his attention to the study of literature, especially that pertaining to the Russian Empire and the Russian people. He became proficient in the use of the Russian language, from which he made and published a number of translations. Besides numerous short stories and sketches published at various times in periodicals he was the author of *Kriloff and His Fables; Liza; Songs of the Russian People; Russian Folk Tales*, etc. He died in England, Aug. 7, 1889. G.J.H.

RAM, Marine. See Navy, in these Supplements.

RAMADAN OR RAMAZAN. See FASTING, Vol. IX, p. 44.

RAMAH, an ancient Hebrew stronghold. See SAMUEL, Vol. XXI, pp. 264, 265.

RAMAYANA, an ancient epic poem of India. See SANSKRIT, Vol. XXI, pp. 294–297.

RAMESES OR RAMSES, three kings of ancient Egypt. See EGYPT, Vol. VII, pp. 640–642.

RAMIE OR CHINA GRASS. See RHEA FIBRE, Vol. XX, pp. 520, 521.

RAMMOHUN ROY, RAJAH. See ROY, Vol. XXI, pp. 40, 41.

RAMOTH, a Hebrew city of refuge; scene of battle in which King Ahab was killed, and of the anointing of Jehu (1 Kings xxii; 2 Kings ix). See GILEAD, Vol. X, p. 531.

RAMPART. See FORTIFICATION, Vol. IX, p. 371.

RAMSAY, SIR ANDREW CROMBIE, geologist; born in Glasgow, Scotland, Jan. 31, 1814. His attention was early turned to geology, his useful work in which brought him to the attention of Roderick Murchison, the geologist, who secured him a place on the geological survey. For years he worked in Wales, also serving after 1847 as professor of geology at University College, London. He became senior director of the Geological Survey for England and Wales, and in 1871 succeeded Murchison as director-general. On his retirement in 1881 he was knighted. He died at Beaumaris, Dec. 9, 1891. G.J.H.

RAMSAY, WILLIAM, a Scotch chemist; born in Glasgow, Oct. 2, 1852. He received his education at Glasgow University, and later at Tübingen, where he graduated in 1872. He was assistant professor of technical chemistry in Glasgow University until 1880, when he became professor of chemistry at University College, Bristol; became principal in 1881, and professor of chemistry at University College, London, in 1887. He was elected a fellow of the Physical Society (1886), and of the Royal Society (1888), besides being a member of various other bodies. The most important of his works, and the one by which he is best known, is the description of argon, the new element of the atmosphere, which he discovered simultaneously with Lord Rayleigh.

RAMSAY, WILLIAM MITCHELL, educator; born in Glasgow, Scotland, March 15, 1851; was educated at the universities of Aberdeen, Oxford, and Göttingen. In 1880–91, 1898, and 1901–02 he traveled extensively in Asiatic Turkey. He accepted the chair of classical art at Oxford University in 1885, and that of humanity at Aberdeen University in 1886, and came to the United States to lecture at Johns Hopkins University in 1894. His publications include *The Historical Geography of Asia Minor; The Church in the Roman Empire; The Cities and Bishoprics of Phrygia; St. Paul, the Traveler and the Roman Citizen; Impressions of Turkey; Was Christ Born at Bethlehem?; Historical Commentary on Galatians; The Education of Christ*, etc. G.J.H.

RAMSEY, ALEXANDER, statesman, was born near Harrisburg, Penn., on September 8, 1815, and began the practice of law there in 1839. In 1840 he was a campaign speaker for Harrison and Tyler, and in 1843–47 was a Whig representative in Congress from Pennsylvania. In 1849 he was appointed governor of the territory of Minnesota, and served until 1853, was mayor of the city of St. Paul in 1855–57, and was governor of the state of Minnesota from 1859 to 1863. In that capacity he was the first of all state governors to respond to Lincoln's call for troops in 1861. From 1863 to 1875 he was United States Senator from Minnesota, and in 1879–81 he was Secretary of War. He died on April 23, 1903. W.F.J.

ALEXANDER RAMSEY.

RANAVALONA, MANJAKA III, Queen of Madagascar; born in 1861. She was crowned Nov. 2, 1883, succeeding Queen Ranavalona II, by whom she had been appointed as the future queen. Soon after ascending the throne she married Prime Minister Rainilaiarivony, who was deposed in October, 1895, when a new ministry was organized under the French protectorate, which controls the interior administration of the island. The queen lived a secluded life at Antananarivo. See also MADAGASCAR, in these Supplements.

RANCAGUA, Chile, the capital of the department of O'Higgins, 40 miles by rail south of Santiago. The city is in the valley of the Rapel River, and was the scene of the siege and battle of October 1 and 2, 1814, when the republican General O'Higgins, was defeated by the royal Spanish troops, but managed to retreat with his shattered forces after the town had been laid in ruins. Population, 7,000. C.L.S.

RANCE, ARMAND JEAN DE. See TRAPPISTS, Vol. XXIII, p. 556.

RANDALL, JAMES RYDER, journalist and poet, was born in Baltimore on January 1, 1839, and was educated at Georgetown College, D. C. He became a journalist and wrote much for the support of the Confederate cause. His stirring lyric, *Maryland, My Maryland!* was one of the most popular of all the war songs of the South. He also wrote *The Sole Entry*, *Arlington*, *There's Life in the Old Land Yet*, *The Battle Cry of the South*, and other poems. After 1861 he made his home in Georgia. W.F.J.

RANDALL, SAMUEL JACKSON, statesman, was born in Philadelphia on October 10, 1828, received an academic education, and entered mercantile life. He became a member of the city council of Philadelphia in 1854, and of the State Senate in 1856. He served in the army in the Civil War. In 1862 he was elected a representative in Congress from a Philadelphia district, as

a Democrat, and was kept in his seat by successive re-elections to the end of his life. He was speaker of the forty-fifth and forty-sixth Congresses, and although he was a protectionist and thus in disagreement with a large share of his party he was for many years the unchallenged Democratic leader of the House and one of the foremost Congressmen of his time. He died on April 12, 1890. W.F.J.

RANDALL MACHINE. See HARVESTING MACHINERY, in these Supplements.

RANDEGGER, CAVALIERE ALBERTO, an Italian composer; born in Trieste, April 13, 1832. He studied under Lafont for the pianoforte and under Ricci for composition; was musical director in theaters at Fiume, Zara, Brescia and Venice until 1854, when he went to London. He became widely known as a composer, conductor and teacher; was appointed teacher of singing at the Royal Academy of Music, London, in 1868; later became director; and in 1892 was made a knight of the Crown of Italy. His best-known works are *Bianca Capello* (1854); a *Funeral Anthem* for the death of the Prince Consort (1862); *The Rival Beauties* (1864); *Fridolin* (1873); and *I Naviganti*.

RANDOLPH, Massachusetts, a town of Norfolk County, in the central-eastern part of the state, thirteen miles south of Boston. It is in the heart of a manufacturing and gardening region, and has extensive boot and shoe factories. It is the seat of a high school and of a public library, and is a favorite place of residence. It is reached by the Old Colony division of the New York, New Haven and Hartford railroad, and had in 1900 a population of 3,993. W.F.J.

RANDOLPH, Vermont, a town and village of Orange County, in the central part of the state, 25 miles south of Montpelier, on the White River and on the Central Vermont railroad. It is in an agricultural and dairy region. Its population in 1900 was 3,141. W.F.J.

RANDOLPH, EDMUND, statesman; was born at Williamsburg, Virginia, on August 10, 1753, was educated at William and Mary College, and became a lawyer. He was mayor of Williamsburg in 1776, helped to prepare the first constitution of Virginia, was the first attorney-general of the state, served in Congress in 1779–82, and was governor of the state in 1786–88. He was a prominent member of the Federal Constitutional Convention, but pursued in it an erratic course. He was attorney-general in Washington's Cabinet in 1789, and succeeded Jefferson as Secretary of State in 1794. In that office, in most trying times, his honor was impugned by Fauchet, the unscrupulous French Minister to America, the rest of the Cabinet turned against him, and he was compelled to resign amid a storm of obloquy. His private estate was confiscated by a decision of the Treasury, and he was recorded as a defaulter to the Government. He retired to Virginia, practiced law and was the author of a few political pamphlets. He died on September 13, 1813. Later researches have largely vindicated his memory and have shown him to have been a pure and able patriot who was unjustly made to suffer for the faults of others. W.F.J.

RANDOLPH, GEORGE WYTHE, soldier, son of Thomas Mann Randolph, was born at Monticello, Va., on March 10, 1818. At the time of John Brown's raid at Harper's Ferry he commanded an artillery company, and at the outbreak of the Civil War he led it into the Confederate service. For gallantry at Big Bethel he was made a brigadier-general. He was one of the peace commissioners appointed to confer with President Lincoln, and was Confederate Secretary of War for a time in 1862, and agent in France in 1863. He died on April 4, 1867. W.F.J.

RANDOLPH, PEYTON, statesman; was born at Williamsburg, Virginia, in 1721, was graduated from William and Mary College, studied law in London, and became King's attorney for Virginia in 1753, in which office he had a bitter controversy with Governor Dinwiddie. In 1766 he became Speaker of the House of Burgesses. At the beginning of the Revolution he was looked to as a leader, he was a close friend of Washington and Jefferson, was president of the first Continental Congress and also began service in the second Congress, but died suddenly of apoplexy on October 22, 1775. W.F.J.

RANDOLPH, THOMAS MANN, statesman, was born at Tuckahoe, Va., on October 1, 1768, and was educated at the University of Edinburgh, Scotland. He married a daughter of Thomas Jefferson, was a representative in Congress in 1803–07, was an officer in the War of 1812, and was governor of Virginia in 1819–21. He died on June 20, 1828, as a result of exposure caused by giving his cloak to a needy beggar and riding home without it. W.F.J.

RANDOLPH–MACON COLLEGE, an educational institution located at Ashland, Virginia, with preparatory schools at Bedford City and Front Royal, and a woman's college at Lynchburg, with the same courses offered at Ashland. The college was founded by the Virginia and Baltimore conferences of the Methodist Episcopal Church in 1832, in Mecklenburg County, but after the war was removed to Ashland. There is an endowment of about $450,000, besides the equipments. This, with all other sources of income, furnishes some $25,000 yearly. There is a library of 12,000 volumes; the faculty in 1901 numbered 13, and the student body about 132. In the girls' school there are 15 teachers and about 125 students.

RANGE–FINDER. Owing to the great cost of manipulating modern guns it becomes essential to make each shot effective, and of late years much study has been given to this subject, and great advances have been made. Two recent devices for range-finding have been invented by Americans—one by Lieutenant Isaac N. Lewis of the army, and another by Lieutenant Bradley A. Fiske of the navy. That of the former is for battery use in coast-defense, and has been adopted by the United States army. This instrument is essentially a depression range-finder, requiring a height of at least thirty feet for effective use, and will give the range up to

eight miles. The instrument affords a rapid mechanical solution of a right-angled triangle, of which the vertical is the height of the instrument above the sea-level, and the base is the range of the object looked at through the telescope. It consists of a cast-iron circular table, upon which is mounted a telescope-holder, or cradle, pivoted in the center, and having the telescope pivoted at the front end of the cradle. The instrument can be manipulated by one person, who can find any range in five seconds. He has only to direct the telescope on the ship's water-line, read the range directly in yards from the range scale, and the direction of the ship from any given base-line from another device. The instrument has automatic corrections for refractions, rise and fall of tides, and curvature of the earth.

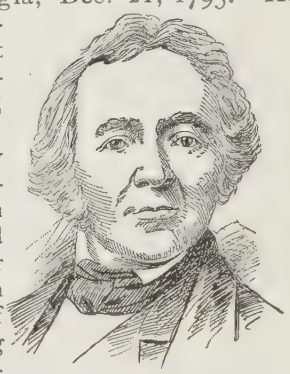
The Fiske instrument is not at all complicated, involving only elementary knowledge of mathematics and electricity. It is based on the familiar mathematical proposition that if two angles and one side of a triangle are known, the other two sides of the triangle can easily be found. The Fiske range-finder, however, eliminates all calculations, and finds the range automatically. A base-line fixed once for all on the ship, is the known side of the imaginary triangle. The distance of the object is represented by either of the other two sides. The target, therefore, is at one angle of the imaginary triangle, and at the other angles, at the extremities of the fixed base-line, are placed two spy-glasses, which can be directed upon it. As these spy-glasses are turned into the proper position they move over and touch wires which are bent in the form of arcs. The differences in length of the wires passed over corresponds mathematically to the distance of the object. As this length of wire increases or diminishes, it will offer more or less resistance to an electrical current sent through it. A very simple electrical contrivance, amounting practically to a balance, allows this resistance to be measured and read, not in units of resistance, but in yards. The two spy-glasses being pointed at the target, the observer at each spy-glass has nothing to do but to keep it thus pointed. Elsewhere in the ship, another observer may stand at a telephone, listening to a buzzing sound produced by an electrical device known as a circuit-breaker, and simultaneously moving with one hand a pointer over a graduated scale. The instant the buzzing in the telephone stops, he reads the range denoted by the pointer from the scale, and conveys the information by a simple form of telegraph to the men at the guns.

For coast-defense several improvements have been added to Fiske's instrument. The latest plan is to have the ground over which the battery sweeps delineated on a brass plate, which is fitted on the tripod of one of the instruments. Two pointers sweep over the plate, one of which remains parallel to the telescope overhead and the other is kept parallel to the telescope at the other end of the base-line by means of electrical connections. The brass plate is divided into a number of squares, the sides of which are in proportion to the sides of the squares into which the actual territory is divided. The point of intersection of these arms is the exact location of the target. The distance of the target is found in the same way as on board a vessel. Then the whole is reported to the officer at the battery, the location being indicated by the squares.

Another range-finder was patented in 1896 by F. J. B. Codeiro, and is for use by hand. It consists of a telescope at one end of and at right angles to an arm about three feet long. A prism is at the end of the arm and another in front of the glass. These, when moved into the right position, reflect the image into the telescope. By means of a vernier scale one angle is obtained, and the right angle and base being known, the distance can be determined. See also TELEMETER, Vol. XXIII, pp. 136, 137.

RANIDÆ, the family of true frogs, consisting of about two hundred and fifty species, widely scattered over the world. Some species are aquatic, others arboreal. *Rana*, the typical genus, has over one hundred species. See also FROG, Vol. IX, p. 698.

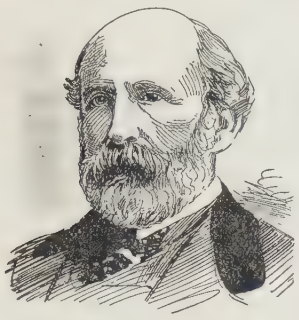
RANKE, LEOPOLD VON, a German historian; born at Wiehe, Thuringia, Dec. 21, 1795. He studied at Leipsic and became in 1818 a teacher at the gymnasium of Frankfort-on-the-Oder; in 1825 professor extraordinary, in 1834 professor ordinary at Berlin and historiographer of Prussia. In 1867 he was created chancellor of the order *Pour le Mérite*, and on Feb. 13, 1882, the day of his 50th jubilee of having been member of the Academy, a privy councilor. He died May 23, 1886. Already by his first work *Geschichte der Romanischen und Germanischen Völker von 1494–1535* (1824), he, although influenced by historians like Thucydides and Niebuhr, manifested great originality of style and conception, which became still more pronounced by his *Fürsten und Völker in Südeuropa im 16th und 17th Jahrhundert* (1827). It was, however, by his *Die Römischen Päpste, ihre Kirche und ihr Staat im 16th und 17th Jahrhundert* (1834–37), that he excited the admiration of the literary world by the impartiality with which he treated on the historic-political significance of popedom. Of equal worth are *Deutsche Geschichte im Zeitalter der Reformation* (1839–47); *Französische Geschichte im 16th und 17th Jahrhundert* (1852–61); *Englische Geschichte im 16th und 17th Jahrhundert* (1849–63); *Zur Deutschen Geschichte, vom Religions frieden bis gum Dreissigjährigen Kriege* (1868), and *Geschichte Wallensteins* (1869). Among his other works are *12 Bücher Preussischer Geschichte* (1874–79); *Der Ursprung des Siebenjährigen Krieges* (1871); *Historisch-Biographische Studien* (1878). Of his last work, *Weltgeschichte*, begun in 1880, at which he worked incessantly to the very last days of his life, and in which he treated on the antique world in a truly masterly style, he finished the first six



L. VON RANKE.

volumes, the other two were edited by Dove, Wiedemann and Winter. G.A.S.

RANSOM, MATTHEW WHITAKER, an American public man; born in Warren County, North Carolina, Oct. 8, 1826. He was educated at the University of North Carolina, and became a lawyer and planter; was elected attorney-general of North Carolina in 1852, resigned in 1855; a member of the legislature of North Carolina (1858–60); a peace commissioner from North Carolina to the congress of Southern states at Montgomery in 1861; entered the Confederate army, serving as lieut.-colonel, colonel, brig.-general and maj.-general, and surrendered at Appomattox; was in the U.S. Senate from 1872 to 1895; and was then appointed minister to Mexico. He died October 8, 1904.



M. W. RANSOM.

RANTOUL, ROBERT, JR., statesman, was born at Beverley, Mass., on May 13, 1805, and was graduated from Harvard College in 1826. He became a lawyer, and for several years was a member of the Massachusetts legislature, where he advocated the abolition of capital punishment and was the champion of various reforms, especially in the interest of wage-earners. In 1837 he was a member of the state board of education, in 1843 collector of the port of Boston, in 1845 U. S. district attorney, and in 1851 United States Senator to succeed Daniel Webster, who had become Secretary of State. At the end of his senatorial term, which lasted only nine days, he was elected a representative in Congress. He was an outspoken opponent of slavery, and especially of the fugitive slave law. He died suddenly on August 7, 1852. W.F.J.

RANVIER, LOUIS, a French physician; born in Lyons, France, Oct. 2, 1835. He was educated at the Paris School of Medicine; became adjunct director of the laboratory of histology, and in 1875 was appointed to the chair of anatomy, especially created for him; became a member of the Academy of Medicine in 1886; of the Academy of Sciences in 1887; and received the decoration of the Legion of Honor in 1878. His works include *Observations Pour Servir à l'Histoire de l'Adénie* (1868); *Manuel d'Histologie Pathologique* (1869–72); *Traité Technique d'Histologie* (1875–88); and *Leçons d'Anatomie Générale sur le Système Musculaire* (1880).

RAPE. See MEDICAL JURISPRUDENCE, Vol. XV, p. 790.

RAPHALL, MORRIS JACOB, clergyman and author, was born in Sweden in September, 1798. In 1812 he went to England, and lived there from 1825 to 1849, being one of the foremost rabbis and writers on Jewish affairs. He was the translator of the Talmud, the works of Maimonides, and other important books. In 1849 he came to America, and in New York became rabbi of one of the chief Jewish congregations. He was the author of *Post-Biblical History of the Jews*, *The Path to Immortality*, *The Bible View of Slavery*, and other works. He died in 1868. W.F.J.

RAPHIDES. See BOTANY, Vol. IV, p. 78.

RAPID CITY, a city and the capital of Pennington County, western South Dakota, 32 miles S.E. of Deadwood, on the Dakota, Wyoming and Missouri River and the Fremont, Elkhorn and Missouri Valley railroads, in the Black Hills. It is in a good grazing region, but is mostly devoted to mining, gold, tin and mica being mined in the vicinity. The mining of tin is being developed rapidly. Rapid City is the seat of the State School of Mines, and has several banks, churches and papers. Population 1890, 2,128; 1900, 1,342.

RAPID-FIRING GUN. See GUNMAKING, in these Supplements.

RAPP, JEAN, COUNT, a French general; born April 27, 1771, at Colmar; died Nov. 8, 1821; entered the service in 1788; in 1800 adjutant to Napoleon; in 1804 brigade-general; 1805, general of a division; 1807–09, governor of Danzig; distinguished himself at Aspern, and in the Russian campaign; in 1817 a peer and a lieutenant-general of cavalry. He wrote *Mémoirs*. G.A.S.

RAPPAHANNOCK, a river of Virginia, formed by the Union of the North Fork and the Rapidan, which rise in the Blue Ridge of the Alleghany Mountains and flow eastwardly to their point of Union, forty miles above Fredericksburg, where the falls afford water-power. The river is navigable from this point southeast to Chesapeake Bay, which it enters by a broad estuary, seventy miles long. On the Rappahannock and the Rapidan occurred the sanguinary battles of Fredericksburg, Chancellorsville and the Wilderness. Length, about 250 miles.

RAPTORES, a name formerly used to indicate an order of birds, members of which are now included in the order *Falconiformes*, especially its sub-order *Accipitres*. The latter include the secretary-bird, the Old World vultures, and the hawks, eagles, and falcons. R.W.C.

RARITAN RIVER, a stream of New Jersey rising in two branches in western Morris County, which flow southward and unite in Somerset County. It flows east into Raritan Bay; is about 70 miles in length, and is navigable for 15 miles, as far as New Brunswick, where it is joined by the Delaware and Raritan canal, which connects with the Delaware below Trenton, forming a short route between New York and Philadelphia.

RASKOLNIKS, a nonconformist sect. See RUSSIA, Vol. XXI, pp. 89, 90.

RASORES. See ORNITHOLOGY, Vol. XVIII, p. 50.

RASP. See FILE, Vol. IX, p. 140.

RASPBERRY. See HORTICULTURE, Vol. XII, p. 286.

RASSAM, HORMUZD, a British archæologist; born in 1826, in Mosul, in northern Mesopotamia. In 1845 he joined Mr. Layard to assist him in his Assyrian researches. When Mr. Layard returned to England in 1847, Mr. Rassam accompanied him to

complete his studies at Oxford, but at the end of 1849 he was sent out by the British Museum authorities to assist Mr. Layard in his second undertaking. Mr. Layard commissioned Mr. Rassam to succeed him. During this expedition Mr. Rassam discovered, in Nineveh, the palace of Sardanapalus. After this he held a political appointment at Aden; was British representative at Muscat in 1861; and sent as ambassador to King Theodore of Abyssinia to secure the release of some British citizens, but was himself imprisoned for two and a half years, when he and the others were released by Sir Robert Napier. Mr. Rassam published a narrative of the *British Mission to Theodore, King of Abyssinia.* In 1876 he was selected by the trustees of the British Museum to conduct the Assyrian explorations. From that time until July, 1882, he conducted the British national archæological researches in Assyria, Armenia and Babylonia. He discovered, among other sites, the great cities of Sippara, or Sepharvaim, and Cuthah, situated in southern Mesopotamia. During the Turko-Russian war he was sent by the British Foreign Office on a special mission to Asia Minor, Armenia and Kurdistan, to inquire into the condition of the different Christian communities who were said to be maltreated by their Moslem fellow-countrymen.

RATIO. See GEOMETRY, Vol. X, pp. 340–349.

RATITÆ. See BIRDS, Vol. III, p. 605.

RATTAN OR RATAN. See CANE, Vol. IV, p. 711.

RAVENNA, a village and the county seat of Portage County, Ohio, in the northeastern part of the state. It lies 32 miles southeast of Cleveland, to which city it is tributary, and is reached by the Cleveland and Pittsburg, the New York, Lake Erie and Western, and the Pittsburg and Western railroads. It is the center of an agricultural and industrial district, and has a multitude of manufacturing establishments, of great variety, including flour, glass, steel and iron, lumber, bricks, leather goods and vehicles. Its population in 1900 was 4,003. W.F.J.

RAVENSTEIN, ERNEST GEORGE, a German geographer and statistician; born in Frankfort-on-the-Main, Dec. 30, 1834. He removed to London in 1852; held a position in the statistical department of the War Office (1855–74); was a member of the councils of the Royal Geographical and Royal Statistical societies; founded and for ten years was president of the German Gymnastic Society. He published the *Russians on the Amur* (1861); *Geography and Statistics of the British Empire* (1862); *London and the British Isles* (1877); *Englisher Sprachführer* (1884); and prepared a great many maps, including *Eastern Equatorial Africa; British East Africa*, and a *Topographical Map of England and Wales* (1898).

RAWDOM-HASTINGS, FRANCIS. See HASTINGS, FRANCIS, Vol. XI, p. 461.

RAWLINS, a city and the county seat of Carbon County, Wyoming, in the central-southern part of that state. It lies in the heart of the vast plain between the Sweetwater and the Medicine Bow Mountains, and is a center of agriculture and stock raising. It has large mining and quarrying interests, and is the seat of the state penitentiary. It is reached by the Union Pacific railroad, which has repair shops there. Its population in 1900 was 2,317. W.F.J.

RAWLINS, JOHN AARON, soldier, was born in Illinois on February 13, 1831, and became a lawyer. In 1857 he was city attorney of Galena, Ill., and in that city became a close friend of U. S. Grant. In 1861 he entered the army as a captain of volunteers, and was a comrade of Grant in all the latter's campaigns, being made his chief of staff in November, 1862. In 1865 he was brevetted major-general for gallant and meritorious services. On March 11, 1869, President Grant appointed him Secretary of War, but he was already stricken with consumption and he died on September 6, of that same year. He was a man of unusual ability, of puritanical morals, of exquisite modesty and simplicity of life, and of a strength of will and determination rivalling Grant's. He was Grant's most confidential and trusted friend, and probably was of great service to him as a counsellor and aid throughout the war. W.F.J.

JOHN A. RAWLINS.

RAWLINSON, GEORGE, historian; born in Chadlington, Oxfordshire, England, November 23, 1812; was graduated at Oxford University with high honors in 1838, and studied theology there in 1841–42. In the latter year he was appointed an instructor at the university, and remained there till he became curate at Merton, Oxford, in 1846. He was a lecturer at Oxford University in 1859, and three years later he accepted the chair of ancient history there. In 1872 Queen Victoria appointed him canon of Canterbury Cathedral. In connection with this office he became rector of All Hallows' Church, London, in 1888. He held both of these appointments till his death. His reputation, however, rests chiefly on his historical achievements. These show accurate and minute research, and have added to the sum of historical knowledge. He also wrote on Biblical criticism and history. In conjunction with his brother, Sir Henry Creswicke Rawlinson, and Sir Gardiner Wilkinson, he wrote *The History of Herodotus: A New Translation* (with notes, appendices, etc.). His other publications include *The Five Great Monarchies of the Ancient Eastern World; The Sixth and Seventh Great Monarchies; A History of Ancient Egypt; A History of Phœnicia; The Origin of Nations; Historical Illustrations of the Old Testament; The Story of Ancient Egypt; A Memoir of Major-General Sir H. C. Rawlinson*, etc. He also contributed articles to Dr. Smith's *History of the Bible.* He died Oct. 6, 1902. G.J.H.

RAWLINSON, SIR HENRY CRESWICKE, Assyriologist; born in Chadlington, Oxfordshire,

England, April 11, 1810, brother of George Rawlinson; was educated in a school at Ealing and then entered the British army and was sent to India in 1827. He served in the Bombay army till 1833. In that year he was ordered to Persia, where he reorganized the troops of the Shah. In 1840 he was appointed British political agent at Kandahar, Afghanistan, and by his rare judgment during the Afghan War he held that city against attacks without and intrigues within. In 1844 he was appointed British consul at Bagdad and in 1851 was promoted consul-general in Turkey. He returned to England in 1855 to accept the office of crown director of the East India Company. He was promoted major-general in 1859, and created a baronet in 1891. Through his investigations of ancient cuneiform inscriptions he became known as the "Father of Assyriology." In 1837–39 he deciphered the entire Behistûn inscription. During the years he stayed at Bagdad he made translations and copies of various ancient manuscripts for the British Museum, and superintended the excavations which that institution had started at Babylon and Nineveh. As a result of these labors he sent to England many cargoes of slabs and other memorials. His publications include *England and Russia in the East*, and the results of his researches on the cuneiform inscriptions. He died in London, March 5, 1895. G.J.H.

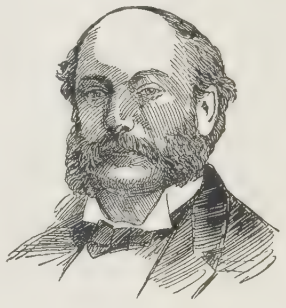
RAWLINSON, Sir Robert, sanitary engineer; born in Bristol, England, Feb. 28, 1810. He became an engineer at Liverpool; worked in railway building under Robert Stephenson; was made engineer of the Bridgewater canal in 1844; and devised a plan to supply Liverpool with pure water from Wales in 1847. His career in sanitary engineering began in 1848, as a superintendent inspector under the Public Health Act, in which he established a new and efficient system of main sewering which has been adopted throughout the world. In 1855 he introduced sanitary works for the army hospitals in the Crimea, greatly reducing the death rate. He subsequently built waterworks for Hong Kong and Singapore, and in 1863 established sanitary works throughout the cotton factory districts of England. He was knighted in 1883, and died May 31, 1898. G.J.H.

RAWSON, Sir Rawson William, an English statistician; born in London, Sept. 8, 1812. He was appointed to the Board of Trade in 1829; rose to be first assistant to its chief,—a post which he held till 1842; was then sent to Canada as civil secretary; in 1854 became colonial secretary of the Cape of Good Hope; was later, also, made financial minister, and superintended the taking of the census; in 1864 became governor of the Bahamas and acting governor of Jamaica, was made commander-in-chief of the Windward Islands in 1869, and retired from service in 1875. He was a member of numerous societies, and on his retirement was made a knight commander of St. Michael and St. George. Among his publications are *International Vital Statistics* (1885); *Synopsis of the Tariffs and Trade of the British Empire* (1888–89); and *Gospel Narrative; or, The Life of Jesus Christ* (1892).

RAY, Isaac, physician, was born at Beverley, Mass., on January 16, 1807, studied at Bowdoin College and the Harvard Medical School, and became a physician at Portland, Maine, in 1827. Two years later he removed to Eastport, where he devoted himself to the special study of mental diseases, and wrote a notable work on *Medical Jurisprudence of Insanity*. He became superintendent of the state asylum for the insane at Augusta in 1841 for four years, and then became head of the Butler hospital for the insane at Providence, R. I. In 1866 he removed to Philadelphia, and practiced there until his death; also writing several more books. He died in Philadelphia on March 31, 1881. W.F.J.

RAY, John, naturalist, was born near Braintree, in Essex, England, in 1627, the son of a blacksmith. He was graduated from Trinity College, Cambridge, and became a fellow there, in 1649, was professor of Greek in 1650, and a tutor in mathematics in 1652. On account of impaired health he then left Cambridge and travelled over England and Wales, studying botany and zoology and other branches of natural history. In 1663–66 he similarly travelled on the continent of Europe, and afterward published an account of his tour. He was elected a fellow of the Royal Society in 1667. He wrote several books which Cuvier regarded as "the foundation of modern zoology." He died in 1704. W.F.J.

RAYLEIGH, John William Strutt, Lord, physicist; born Nov. 12, 1842. He graduated at Trinity College, Cambridge, in 1865, became third Baron Rayleigh in 1873, and was professor of experimental physics in Cambridge University in 1879–84. In 1884 he was president of the British Association, and from 1887 to 1896 was secretary of the Royal Society. In 1888 he succeeded Tyndall as professor of natural philosophy in the Royal Institution, which chair he still retains. Since 1896 he has been scientific adviser to Trinity House, the British lighthouse board. Lord Rayleigh is regarded as one of the greatest of living physicists, his researches being largely in the field of electrical standards and physical optics, while the results of his important studies in acoustics are given in his work *The Theory of Sound*. He also edited Clerk Maxwell's *Theory of Heat*. In 1894, working in association with Prof. William Ramsay, he discovered a new gaseous element, which constituted about one per cent. of the atmosphere, and to which they gave the name of "argon." For this signal discovery they were awarded the $10,000 Hodgkins prize for the most important discovery concerning the atmosphere, and the



LORD RAYLEIGH.

Columbia College Barnard medal for meritorious service to science. Lord Rayleigh is a member of several American societies and of the French Institute. G.J.H.

RAYMOND, Henry Jarvis, journalist, was born at Lima, N. Y., on January 24, 1820, and was graduated from the University of Vermont in 1840. He then studied law in New York, and at the same time began writing for Horace Greeley's paper, the *New Yorker*. When Greeley founded the *Tribune*, in April, 1841, Raymond was engaged as a member of its staff, and showed himself an exceptionally competent journalist. Two years later he was employed by the *Courier and Enquirer*, and remained with it until 1851, when he founded and became editor of the New York *Times*. He was a member of the legislature in 1850–51 and speaker of the assembly in the latter year; and lieutenant-governor in 1855–57. He was an influential leader of the Republican party, and was the author of several books of political history. He died in New York on June 18, 1869. W.F.J.

H. J. RAYMOND.

RAYMOND, John T., an actor. See O'Brien, John, in these Supplements.

RAZOR-CLAM, the popular name of a bivalve mollusk of the family *Solenidæ*. The long and narrow shells suggested the name. The old typical genus *Solen* has been divided into the genus *Solen*, which includes the straight shells, and *Ensis*, which contains the curved shells. *Ensis Americana* is found on the sandy shores of the Atlantic coast of the United States. It burrows with great rapidity, and is not easily captured.

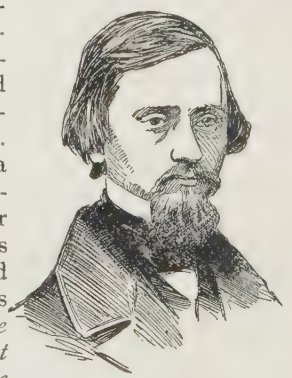
READ, George, jurist and revolutionary patriot, was born in Maryland in 1734, was admitted to the bar at the age of nineteen years, and began legal practice in Delaware. In 1763 he was appointed attorney-general for Delaware, and in 1774 he was elected to Congress and remained a member of that body during most of the revolutionary period. He signed the Declaration of Independence, was president of the first constitutional convention in Delaware, became U. S. admiralty judge in 1782, was the first U. S. Senator chosen in Delaware, and in 1793 became chief justice of the state of Delaware, filling that place until his death in 1798. W.F.J.

READ, John Meredith, diplomat, was born in Philadelphia, on February 21, 1837, a grandson of George Read (q. v.). He was graduated from Brown University in 1858 and afterward studied international law in Europe. He took an active interest in politics as a Republican as early as 1856, and in 1860 was made adjutant-general of the state of New York, with the rank of brigadier-general. For his efficiency in the military service of the state during the war he won the thanks of the National government. In 1869 he was appointed consul-general at Paris, and during the Franco-German War of 1870–71 was entrusted with the protection of German citizens in France and was practically German consul-general. In November, 1873, he was appointed American minister to Greece, and filled that place for more than six years, rendering invaluable services during the Russo-Turkish War and in the governmental crisis in Greece in 1878. During his diplomatic career he made a most interesting collection of diplomatic and historical documents, letters, etc. He died in Paris on December 27, 1896. W.F.J.

READ, Opie, an American author, born in Nashville, Tennessee, Dec. 22, 1852; was educated at Neophogen College, Gallatin, Tennessee. Took up newspaper work upon graduation, and followed his profession in Little Rock, Louisville, Nashville and Cleveland. Finally started *The Arkansaw Traveler*, a weekly paper of humor and literature, at Little Rock, Arkansas, which had quite a success until it was removed to Chicago and he resigned from its editorship, when it was discontinued. Among his stories of Southern life are *Len Gansett* (1888); *A Kentucky Colonel* (1890), which was dramatized, and made a decided hit on the stage, and which has been republished in England, where it has been received favorably; *Emmett Bonlore* (1891); *A Tennessee Judge* (1893); *The Wives of the Prophet* (1894); and *The Jucklins* (1896).

OPIE READ.

READ, Thomas Buchanan, painter and poet, was born in Chester County, Penn., on March 12, 1822, studied sculpture and painting in Cincinnati, and in 1841 removed to New York, and practiced portrait painting there and in Boston. He settled in Philadelphia in 1846, went to Europe in 1850, and after 1853 spent most of his time in Florence and Rome. Of his paintings the best known are *The Lost Pleiad*, *The Spirit of the Waterfall*, *The Star of Bethlehem*, *Cleopatra and Her Barge*, and portraits of Mrs. Browning and Longfellow. His reputation rests chiefly, however, upon his poems, and especially upon a few of his shorter and lyrical poems. His *Wagoner of the Alleghanies*, *The New Pastoral*, and other long and elaborate poems, are uneven in quality, but contain some charming passages and on the whole are inspired with true poetic feeling and a particularly pure and healthful tone. His *Sheridan's Ride* is one of the most stirring of



T. BUCHANAN READ.

American patriotic ballads, his *Drifting* is a lyrical gem, and *The Closing Scene* is one of the noblest elegiac poems in American literature. He died of pneumonia in New York, on May 11, 1872. W.F.J.

READE, WILLIAM WINWOOD, traveler; born in Ipsden House, Oxfordshire, England, Jan. 30, 1838; nephew of Charles Reade, the novelist. He was educated at Oxford, and, instigated in 1861 by Du Chaillu's story of the gorilla, set out for Africa and ascended the Gaboon, to observe the animal in its native haunts. He afterward traveled in Angola, and in 1869 and later sought without success the sources to the Niger. In 1873 he returned to Africa as *Times* correspondent during the Ashantee War. He died April 24, 1875. G.J.H.

READING, Massachusetts, a town of Middlesex County, in the northeastern part of the state, about twelve miles north of Boston, on the Boston and Maine railroad. It is a considerable industrial center, its manufactures including leather, rubber and metal goods. Its population in 1900 was 4,969. W.F.J.

READING, Pennsylvania, an important city and the county seat of Berks County, in the southeastern part of the state. (For general description, see READING, Vol. XX, p. 317.) Its beautiful situation in the valley of the Schuylkill River, its proximity to Philadelphia (47 miles), and its exceptional railroad and canal transportation facilities, together with its strategic position at the gateway of the great anthracite coal region, have combined to make Reading grow rapidly in population, industries and wealth. The neighboring hills and mountains have grown in favor as places of summer resort, fine parks have been laid out, and the city has been quick to introduce electric lighting and traction service and other modern improvements of urban life. There are several high schools and public libraries. In 1900 there were 435 manufacturing establishments, with a total capital of more than $14,000,000, and with 13,000 employees. The population has grown from 58,661 in 1890 to 78,961 in 1900. W.F.J.

REAGAN, JOHN HENNINGER, statesman, was born in Sevier County, Tenn., on October 8, 1818, spent his youth on a farm, and was educated in the common schools and, for one year, in college at Marysville, Tenn. He then became a pioneer in the struggling republic of Texas, served in a Texan Indian war, was a deputy surveyor of public lands, a justice of the peace and an officer of militia. He became a probate judge in 1847, member of the Texas legislature in 1847, a judge in Texas in 1852–57, and a representative in Congress in 1857–61. At the outbreak of the Civil War he identified himself with the Confederacy, was a member of its provisional Congress in 1861, postmaster-general of the Confederacy in 1861–65, and secretary of the treasury in 1865. He was a representative in Congress again in 1875–87, and was the author of the Interstate Commerce bill which formed the basis of the present law. He was a Senator from Texas from 1887 to 1891, and in the latter year became chairman of the Texas State Railroad Commission. Died at Palestine, Texas, March 6, 1905. W.F.J.

J. H. REAGAN.

REALGAR. See ARSENIC, Vol. II, p. 555.

REALISM, in philosophy. See HAMILTON, Vol. XI, p. 373; SCHOPENHAUER, Vol. XXI, p. 479; and *Universals*, under SCHOLASTICISM, Vol. XXI, pp. 436, et seq.

REALISM is a name for the search for the actual, especially in the domain of philosophy and art. It might be said, by artificial thinkers, that all scientific investigations are a search for the actual, and hence realistic, but from a metaphysical point of view dealing with external phenomena may be very far from pursuit of reality. Without a metaphysic, the scientist is stranded inevitably upon a collection of unrelated observations, which is the precise difficulty Hume found in his speculations. To such a mind, cause and effect are reduced to a mere sequence in time, and the process of generalizing, or the use of hypothesis, has small value. Thus the modern physicist, from the doctrine of the correlation of forces, is driven to educe the principle that force is a fixed and eternal quantity; the chemist holds that there are indestructible atoms, the number of which is never increased or diminished; the biologist believes that life proceeds from life, and that species are developed by natural selection. These hypotheses, and they are no more, fruitful as they have been in illumining the whole field of science, are the contribution of the human mind to the study of phenomena. The mind is philosophical, and because it is so, men come to a belief in natural law; and that is a most imperative necessity of thinking. The metaphysician will say that such laws are realities, and the scientist also assumes their inexorable and eternal nature. From both sides comes a common purpose to reach out for the absolute unity in which all phenomena, psychological and external, are related. If the scientist declares himself an agnostic, he simply means that his instruments of research and thought are inadequate to go beyond phenomena. These phenomena certain schools of philosophy call evanescent, and only the partial embodiment of persisting thought-realities. Yet the student of nature has a large number of hypotheses and mathematical relations, revealed to him by reflection, that are very dominant and actual in the world. In finding these laws of relation, he, too, is a realist of the most emphatic sort. To him they are the realest of things. Still, we do not apply the term *realism* to investigations concerned wholly with facts of nature, but only to those studies in which idealism and realism are relative terms. See IDEALISM, in these Supplements.

Art. The same spirit of reflection and criticism which prevails in other matters in modern times has had its influence on literary, graphic and plastic arts.

it demands that imagination, with its romance and exuberance, give place to the representation of things as they are. There is no exact significance in the term *realism*, and according as they restrict it to faithful portraiture of vulgar things, or expand it to embrace faithful depicting of excellencies, the critics will condemn or applaud the school. It is a far call from Holman Hunt's *Shadow of Death* or *Flight into Egypt* to Bonnat's *Christ on the Cross*, and yet both men are realistic, Hunt having gone to the Orient to paint in his accessories of Christ in the carpenter's shop and the flight, while Bonnat chose to exhibit the anatomical contortions of pain. In literature, William D. Howells and Émile Zola are at the antipodes of realistic fiction, but, aside from quality of diction, the substantial difference of the men is in the choice of subjects.

Realism in Europe is supposed to be a peculiarly French production, because there the school has had the extremest development and the most advocates. Yet Adolfo Bartoli of Florence places its literary origin with Manzoni and Leopardi. A discussion of this point will be found under ITALY, Vol. XIII, p. 525. Tolstoi must be classed among the realists.

It by no means follows that all realists work on the plane of Zola's *L'Assommoir*. There is too much reason to regret that realism in art should be identified with the hard characters of *La Comédie Humaine*, or the procession of vulgar people in the *Rougon-Macquart* series. Flaubert and Couture are not the only, or the best, examples of this school, although an abundance of tales and pictures given to salacious, sordid and brutal themes have allowed the impression to go abroad that they alone are realistic. Realism has little to do with the choice of subjects, but with their manner of treatment when selected. The characteristics of it are a detailed exploitation of character; personalities in which the good and bad mingle in a natural way, none impeccable, but some, alas, without the luster of virtue; indifference to plot, sometimes neglect of it; no poetic rewards and retributions, but simply the unsolved common enigma of life portrayed. The artists deal with life as it is; romance recedes; the imagination is chained to experience, the mind to observation. But, clearly, all these qualities may inhere in a portraiture of estimable characters as well as in a tale of grisettes and men of the town. In art, whether literary or graphic, there will always remain some idealism. It is inseparable from personality. In its higher aspiration, realism is the effort to find art in natural and familiar things. It is often said that mechanical invention and the exactitudes of modern research are fatal to the artistic spirit,—that locomotives and telegraphs are not picturesque; that chemistry and electricity have inspired no epic nor lyric. Yet the wonders of invention and research do excite the imagination, if no true art has yet been found for the expression of that excitement. If art is suffering from a degeneration because modern emotions of wonder have found no imaginative forms of expression, it may be the function of realism to work out this problem of real life, until new art-forms are found that are pure and noble, even to the standards of the old romance.

Philosophy. Realism in metaphysic did not differ from the idealism of the Greek or neo-Platonic philosophers. It was simply the assertion that ideas were actual entities, and the prototypes of the phenomenal. It came into marked prominence among the schoolmen in opposition to nominalism. Nominalism asserted that existence was predicable only of individuals or particulars. To this the more orthodox schoolmen objected, that individuals were only parts of a process, and that taken by themselves they left particulars unrelated. They also thought it a theory destructive of personal identity, and hence of all philosophy, as well as of all theistic religion. Among the realists of mediævalism were some of the greatest theologians of the church, as Erigena, Anselm, Aquinas and Scotus. They held that particular things were only transitory, constantly giving way to similar successors; that beneath this pageant of nature was a persistent reality, the idea, or the universal, by which the phenomenal could be classified and related. Their assertion of the entity of universals was scholastic realism. This doctrine carried with it, in their estimation, the continuity of the soul, its responsibility and immortality, and the existence of God.

Since Sir William Hamilton's doctrine concerning the validity of perceptions was published the followers of the Scotch, or common sense, school call their philosophy "realism." Its last exponent, Dr. James McCosh, in 1887 restated its position in a treatise entitled *Realistic Philosophy Defended.* This is another sense of the term,—one which is not concerned primarily with universal terms. This school of philosophy assumes a like validity for sense-perceptions, as for other affirmations of consciousness. It claims as a postulate of common sense, that there is an external reality answering to the perception of it; that the perception of an external object is as unmediated as the perception of an idea. Both stand alike for realities. For Hamilton's doctrine, see Vol. XI, p. 373.

D. O. KELLOGG.

REALITY See *Theory of Knowledge*, under LOGIC, Vol. XIV, pp. 805, 806.

REAL PRESENCE OF CHRIST IN THE SACRAMENT. See EUCHARIST, Vol. VIII, pp. 573, 574.

REAPING AND HARVESTING MACHINES. See AGRICULTURE, Vol. I, p. 286; and HARVESTING-MACHINES, in these Supplements.

REASON. See LOGIC, Vol. XIV, pp. 787–812; and ASSOCIATION OF IDEAS, Vol. II, pp. 638–642.

REBEC. See VIOLIN, Vol. XXIV, p. 261.

RECAPITULATION THEORY. See EMBRYOLOGY, in these Supplements.

RECAPTURE. See PRIZE, Vol. XIX, p. 786.

RECEIPT. See PAYMENT, Vol. XVIII, pp. 451, 452.

RECEIVER, as the term is used in law, is a person appointed by a court having chancery powers to take possession of the property of another, or a portion thereof, and receive the rents, profits and issues arising therefrom. A receiver is a ministerial officer of the court, with only such powers as the court confers upon him by order. He should be

disinterested in the controversy which has resulted in his appointment. Hence, generally, courts will not appoint attorneys interested in the suit, or officers of a corporation when the corporation property is to be turned over to a receiver, although these questions are left largely to the judgment and discretion of the court. A receiver is appointed only in cases where it appears to the court necessary for the protection of the property interests of some of the parties. Receivers frequently are appointed to assume control of real estate and collect the rents and profits thereof, when such real estate is the subject of litigation, as in the case of foreclosure of mortgages and other proceedings in equity. The most important use of receivers in the United States is in the case of financial difficulties arising in connection with business enterprises, in which, upon the application of creditors, or some one interested in the business, the court appoints a receiver to take charge of the business, and either continue its operation for the benefit of all parties in interest, or close it out and apply the proceeds in payment of the indebtedness. The right to appoint receivers for insolvent concerns, or those financially embarrassed, usually is provided by statute; and while the circumstances justifying such action, and the method for procuring the appointment of receivers, are substantially uniform, yet many minor differences are found among the various states. It is a general rule that a receiver will be appointed to take charge of the assets of a corporation if the officers are mismanaging its affairs or misappropriating its funds so as to endanger or impair the rights of creditors or stockholders. The disposition of the assets of a corporation for which a receiver has been appointed will depend upon the circumstances surrounding the case and the judgment of the court as to the best method of protecting the rights of interested parties. In the case of railroads and other large corporations, where interests are large and involved, and a great number of persons are interested, a receiver will frequently be permitted to conduct the business under direction of the court until all rights are determined fully and its affairs adjusted and placed upon a sound basis. In case of small corporations and partnerships, receivers are not often appointed, except in case of insolvency, in which case the receiver generally is ordered to dispose of the assets at the earliest time possible; and if he continues the business, it is usually only temporarily, until it can be closed out to the advantage of the parties in interest.

In such cases the appointment of a receiver is an insolvency proceeding enforced by the court. The distribution and administration of the assets by a receiver is governed by about the same rules as those which prevail in case of a voluntary assignment for the benefit of creditors to a person named by the debtor as assignee, the chief difference being that in one case the court compels the assignment, and in the other it is the voluntary act of the debtor. The pay of a receiver is usually left to the discretion of the court, and is allowed out of the assets of the estate. The remedy by procuring the appointment of a receiver of an insolvent concern is in very general use, and results equitably to all parties. The proceeds, in such cases, are distributed *pro rata* among creditors, who generally are required to file verified statements of their claims with the receiver before being entitled to share in the distribution. The receiver or other creditors may file objections to these claims and require proof to be made thereof.

RECIPROCITY, in a political sense, means the interchange of commodities between the subjects of different governments without levying export or import duties thereon, free entrance being permitted by each government in consideration of like privileges extended by the other. Reciprocity is brought about by means of treaties. Such treaties may provide for entire freedom of trade between the citizens of the two countries, or they may provide that such free interchange shall apply only to specified commodities. The principle of reciprocity of trade has frequently been recognized in Europe since the fourteenth century, more especially between the free cities. From 1854 to 1866, under treaty between the United States and Great Britain, reciprocity was established between the United States and Canada as to certain commodities, mostly raw material or half-manufactured products. This treaty was terminated finally by notice from the United States to Great Britain, as provided in the treaty. In 1876 reciprocity was established between the United States and Hawaii. The system of reciprocity was not of great importance in the United States until the conference, brought about by Mr. Blaine, as the Secretary of State, between the states of the two American continents, which assembled at Washington, Oct. 2, 1889. This conference was assembled for the purpose of discussing means for better commercial relations between American nations. As a result of the exchange of views, Congress authorized the President to enter into negotiations for the establishment of reciprocity by treaty as to certain commodities. For the history of these measures, see UNITED STATES, in these Supplements.

RECITATIVE AND LYRICAL DRAMA. See MUSIC, Vol. XVII pp. 93, 94.

RECLUS, JACQUES ELISÉE, geographer and scientist, member of a family of marked ability and achievements, was born in La Gironde, France, on March 15, 1830, and was educated in Rhenish Prussia. His political opinions being strongly democratic, he found it expedient to leave France after Louis Napoleon's coup d'état, and thereafter spent several years in travel in Great Britain, and North, Central and South America. Upon his return to France he wrote elaborate series of articles on his travels and observations, chiefly on the social and political conditions of the countries concerned, which were published in the *Revue des Deux Monds* and other periodicals. He also wrote *Les Villes d'Hiver de la Méditerranée et les Alpes Maritimes*, a *Dictionnaire des Communes de la France*, and *La Terre*, the last named a monumental work which has been translated into English and has passed through many editions. During the siege of Paris in 1870–71 he served in the National Guard, and also in the balloon corps organized by M. Nadar. He opposed

the Versailles government and threw in his lot with the Commune, with the result that he was condemned to transportation to a penal colony for life. Upon the petition of scientific men in many lands this sentence was commuted to one of simple exile, whereupon he went to Italy, and thence to Clarens, in Switzerland, where he remained until full amnesty for all the surviving Communists was granted. In 1882 he gave a further demonstration of his radical principles by giving his two daughters in marriage without either a religious or a civil ceremony. He and his friend Prince Kropotkin were charged with Anarchistic conspiracies, but he escaped arrest by retiring again into Switzerland, in 1883. In 1892 he was appointed professor of comparative geography in the University of Brussels. In addition to the works named he has written *Geographie Universelle*, *Histoire d'un Ruisseau*, *Histoire d'une Montagne; Evolution*, *Revolution*, *et l'Ideal Anarchique*, etc. W.F.J.

RECLUS, Élie Armand Ebenezer, naval commander and explorer, brother of J. E. Reclus, was born at Orthez, France, on March 13, 1843, entered the French navy in 1860, and was associated with Bonaparte-Wyse in making explorations and surveys for the Panama canal under the direction of De Lesseps. He wrote a *Report* and several other publications upon the subject of the Isthmian canal, and the article on Ethnography, Vol. VIII, in this Encyclopædia. W.F.J.

RECLUS, Michel Élie, theologian and scholar, brother of J. E. Reclus, was born in La Gironde on June 16, 1827, was educated at a school of the Moravian Brethren in Rhenish Prussia, and studied theology in France and Switzerland. He went into exile with his brother at the coup d'état of Louis Napoleon, but returned to France four years later and was identified with various co-operative enterprises. Because of his participation in the Commune in 1871 he was condemned to penal servitude, but escaped to Switzerland. He collaborated with his brother upon the *Dictionnaire de Communes de France*, and wrote much for various journals and reviews. W.F.J.

RECLUS, Onésime, soldier and author, brother of J. E. Reclus, was born at Orthez, in the Basses-Pyrénées, France, in 1837, and was a soldier in Algiers. He studied in Germany and travelled extensively in Europe and Africa. He was one of the editors of the *Tour du Monde* and wrote *La France et Ses Colonies*, *La Terre à vol d'Oiseau*, and other works. W.F.J.

RECLUS, Paul, physician, brother of J. E. Reclus, was born at Orthez, France, in 1847, studied at Nîmes and Paris, and was graduated in medicine in 1876. He became a hospital surgeon, and won high rank for his skill in operations. He has written *Clinique et Critique Chirurgicales*, *Cliniques Chirurgicales de l'Hôtel Dieu*, and other professional works. W.F.J.

RECLUS, Sœurs. In addition to the five Reclus brothers mentioned, the Reclus family comprised three sisters, who became expert linguists and were the authors of a number of translations and also of original works, the latter comprising fiction, travels, and science. W.F.J.

RECOLLETS, a Roman Catholic order. See Franciscans, Vol. IX, p. 615.

RECONNAISSANCE, GEOGRAPHICAL. See Surveying, Vol. XXII, pp. 748–50.

RECONSTRUCTION. When the Confederate armies surrendered to the Union armies in 1865, the Confederate States passed under the control of the military power of the United States. But they were not members of the Union then: they were conquered territories. They had declared themselves out of the Union by their several acts of secession, and after their conquest were to be dealt with as in the case of other United States territories. But President Andrew Johnson maintained that the Southern states, after laying down their arms, were in the same constitutional relations to the United States government as before their secession. In pursuance of this view he appointed "provisional governors" for these states, although the laws of the United States gave him no right to appoint such officers. Only Congress can create offices in United States territories.

The provisional governors called upon the people of their states to send delegates to enact constitutions for such states. Conventions were held, and the ordinances of secession were repealed and slavery abolished; state constitutions were framed, and in some cases submitted to the people for ratification. In other cases the constitutions took effect from the authority of the conventions alone.

In all cases the colored population had no voice in framing these constitutions, nor in electing the governors, state legislatures, and other officers that were elected under these constitutions.

Congress, in its turn, refused to admit the representatives from the Southern states, and in effect declared that the method of reconstruction which had originated with the President was inconsistent with the United States Constitution. By adopting the XIVth Amendment to the constitution, on June 16, 1866, Congress declared as citizens all persons born or naturalized in the United States, and prohibited the states from depriving any person of life, liberty or property without due process of law, or denying to any person within their jurisdiction the equal protection of the laws. It declared that representatives should be apportioned by counting the whole number of persons in each state, excluding Indians not taxed. It provided that where the right to vote for any office of the United States or a state was denied to any male inhabitant, except for participation in rebellion or other crime, the basis of representation should be reduced in proportion to the number of such excluded citizens to the whole number of male citizens of 21 years of age in such state. It declared that no person shall be a Senator or Representative in Congress, or elector of President or Vice-Presi-

dent, or hold any office, civil or military, under the United States, or under any state, who having previously taken an oath, as a member of Congress, or as an officer of the United States, or as a member of any state legislature, or as an executive or judicial officer of any state, to support the constitution of the United States, shall have engaged in insurrection or rebellion against the same or given aid and comfort to the enemies thereof. It also validated the public debt of the United States and excluded the payment of claims on account of the rebellion or for the emancipation of slaves.

This amendment was promptly rejected by Georgia and North and South Carolina, and ratification was withheld in all other states which had participated in the rebellion, except Tennessee, which promptly ratified it. As Tennessee by its ratification of the XIVth Amendment had virtually accepted the terms of pacification and reconstruction tendered by Congress, this state was, by a resolution of Congress on July 24, 1866, admitted to its former place in the Union and to representation in Congress. By this act Congress had definitely fixed the terms under which the Southern states should be admitted to their full privileges under the United States Constitution. It also withdrew from the President the power conferred upon him in 1862 to grant pardon and amnesty to persons who had participated in the Rebellion. By act of March 23, 1867, Congress declared that no legal governments existed in Virginia, North and South Carolina, Georgia, Mississippi, Alabama, Louisiana, Florida, Texas, and Arkansas. It divided these states into military districts, and placed them under military officers. Military courts were authorized, and all interference by state authority was declared null and void. Authority was conferred upon the enumerated states to form constitutions and choose senators and representatives in Congress; and it was declared that such states should be readmitted to the Union, and their senators and representatives to seats in Congress, when certain conditions should be complied with. These conditions were as follows: The constitution should conform to the Constitution of the United States; it should be framed by delegates chosen by a majority of the votes of the people of the states having the electoral qualifications prescribed by that act; it should be ratified by the same authority; it should be approved by Congress; that no person excluded from office by Amendment XIV should be eligible as member of the convention to form such constitution or vote for the same, or hold office thereunder; that such state should ratify Amendment XIV; that the admission of the state and of its senators and representatives to seats in Congress should take effect when that amendment should be ratified, and become part of the Constitution of the United States. The qualifications of voters prescribed in the act were, that all male citizens of 21 years of age and upward, of whatever color or previous condition, who had resided one year in the state, should be entitled to vote, except where disqualified for participation in rebellion or for felony at common law. The act further declared all civil authority within the state prior to admission, provisional and subject to the military authority.

By the act just mentioned, Virginia constituted the first military district, North and South Carolina the second, Georgia, Alabama and Florida the third, Mississippi and Arkansas the fourth, and Louisiana and Texas the fifth military district. The President assigned to the command of the respective military districts Maj.-Gen. J. M. Schofield to the first, Maj.-Gen. D. E. Sickles to the second, Maj.-Gen. G. H. Thomas to the third, Maj.-Gen. E. O. C. Ord to the fourth, and Maj.-Gen. P. H. Sheridan to the fifth. Major-General Thomas was at his own request, on the 15th of March, 1867, relieved from the command of the third military district and Maj.-Gen. John Pope assigned to that command.

On March 23d and July 19th, 1867, Congress passed the so-called "Reconstruction Acts." The first of these acts was a modification of the previous act providing for government in the South.

It provided for a registration to be made in each of the states there enumerated under the authority of the military officers assigned to them, which should include the emancipated slaves with all other classes, excepting only such persons as had been disfranchised by previous acts. As the exact bearing of this act upon disfranchisements on the ground of aiding in the rebellion was in doubt, the second act of reconstruction was passed to remove such doubt. The persons excluded for participating in the rebellion were declared to be persons who, having been members of the legislatures or of the executive or judiciary of any of these states, had engaged in the rebellion, whether such complicity arose while holding such offices or at a later time.

Under these Reconstruction Acts the qualified voters were registered; elections were held for the choice of delegates to conventions for framing state constitutions; such constitutions were adopted and submitted to the people for ratification. The state offices were filled by election; the legislatures were convened and the state governments were placed in operation. The new state governments promptly adopted the XIVth Amendment, and the respective states were at once admitted to representation in Congress. The commands of the military districts were one after another withdrawn from the Southern states. In 1870 the last ones of these states were readmitted into the Union. After all the states were rehabilitated, Congress was willing and ready to grant an amnesty to those persons who had been disfranchised by the Reconstruction Acts. See also UNITED STATES, Vol. XXIII, pp. 819–834.

RECORDING ACTS. In the United States, statutes have been enacted in all of the states requiring that certain instruments be recorded in public records kept for that purpose, in order to give them effect against persons who have no

knowledge of their existence. These records are provided with indexes, and are open to public examination, so that any person interested may learn of the existence of the instruments recorded. It is generally necessary to copy the entire instrument in the record, so that the public may have notice of its contents. The whole system of land-titles throughout the United States has for many years been the subject of registration, and it is the rule that a conveyance not placed upon record will not have effect as against a subsequent purchase without notice of such conveyance. This system, therefore, renders it imperative that conveyances be placed upon record, as otherwise they may be defeated by subsequent deeds. The principle of the system of registration applies not alone to conveyances of land-titles, but has been extended and enlarged so that now in many states it includes instruments which relate to nearly every class of property. Varying in different states, the recording acts usually include, besides conveyances of land or interests therein, such instruments and claims as powers of attorney, bills of sale, chattel mortgages, town plats, mechanics' liens, homestead claims, and numerous other instruments. These laws have been instrumental in greatly decreasing the acts of fraud made possible by secret conveyances and liens, by requiring such instruments to be placed upon the public records as notice to those who may be interested. See also REGISTRATION, Vol. XX, p. 354; and TORRENS LAND-TITLE SYSTEM, in these Supplements.

RECOUPMENT, the reduction of a demand by the act of the defendant, by setting up in the same action his claim against the plaintiff for damages, growing out of the fact that the plaintiff has not fully complied with the obligations of the contract upon which he sues, or has failed to perform some duty which the law imposes upon him in the execution of the contract. Recoupment originated in the common law, and became useful to prevent circuity of action. Recoupment differs from set-off, in that the damage claimed must arise out of the same transaction upon which the suit is brought. The claim may be for unliquidated damages, and the defendant cannot recover judgment for any excess in his claim above the plaintiff's demand. The reverse is true as to set-off. Among the claims for which the defendant is entitled to recoup against the plaintiff's demand are for breach of warranty, fraud, failure of consideration, failure to deliver part of goods sold, for neglect of duty by attorney, for failure of landlord to repair, for defective performance of contract and for damage to goods by common carrier. The right to recoup for damages as to the claims above specified and many other similar claims as against the plaintiff's suit upon the cause of action out of which the defendant's claim arose, is accorded in almost all, if not all, of the states of the United States. In many states, however, the method to be used in recoupment is prescribed by statute; but, as a rule, the principles of the common law prevail as to the right to recoup. As a general rule, it is necessary for the defendant to set up his claim for recoupment by way of a plea or notice to the plaintiff; but it has been held that when the claim for recoupment is large enough to extinguish the plaintiff's demand, it may be shown under the general issue. See SET-OFF, in these Supplements.

RECOVERY, COMMON. See FINE, Vol. IX, p. 169.

RECTOR. The many religious guilds that flourished during the middle ages and a great many universities were presided over by an officer whose title was rector. In the universities he was *rector scholarum*, while in the guilds he was *rector societatum*. In many universities in Scotland, France, Germany, and, in a few instances, in the United States in academies, the head of the institution is called rector, as are also the heads of Exeter and Lincoln colleges, Oxford. In the United States the title is used for a Roman Catholic clergyman in charge of a school or community, or in control of a congregation. In general, the head of a religious house in the Roman Catholic Church is termed a rector, and among the Jesuits the title applies to the head of a house which is also a college or seminary. In the Episcopal Church the rector is head of an incorporated parish. See also PARISH, Vol. XVIII, p. 301.

RECTUM, DISEASES OF. See DIGESTIVE ORGANS, Vol. VII, p. 198.

RED BANK, a beautiful suburban residence town and summer resort in Monmouth County, New Jersey, twenty-five miles south of New York. It lies on the Shrewsbury River, which is there navigable for large vessels, is surrounded by a fine farming region, and has a considerable trade in fish, oysters, fruit and vegetables. It is reached by the New York and Long Branch railroad and by direct steamers from New York city, and had in 1900 a population of 5,428. W.F.J.

RED-BIRD, a name often applied to the cardinal or Virginian grosbeak (*Cardinalis virginianus*). The male bird is brilliantly colored with red. See also GROSBEAK, Vol. XI, p. 186.

RED BLUFF, a city and the county seat of Tehama County, California, in the north-central part of the state. It lies on the west side of the Sacramento River, and east of the Shasta range of mountains, and is about 80 miles south of Mount Shasta and 170 miles north of San Francisco. It has some manufacturing industries, and is the center of a large trade in fruit, lumber, grain and cattle. It is reached by the Southern Pacific railroad and by boats on the river. Its population in 1900 was 2,750. W.F.J.

REDBUD TREE (*Cerus Canadensis*), a hardy ornamental deciduous tree of the order *Leguminosæ*. When the tree has arrived at full size (12 to 20 feet high) the branches are thickly beset with red flowers, and the singular shape of the leaves, which appear after the flowers, makes a very agreeable variety in summer, so that the trees deserve a place in every garden. W.R.B.

RED CLOUD, a city and the county seat of Webster County, Nebraska, in the "southern

tier" of the state. It lies on the north side of the Republican River, 160 miles southwest of Omaha, and is reached by the Burlington and Missouri River railroad in Nebraska. It is in an agricultural region. Its population in 1900 was 1,554. W.F.J.

RED CROSS SOCIETY, an international association for the relief of the sick and wounded in time of war. Henri Dunant, a Swiss gentleman who aided the medical forces in 1859 in the Italian wars, was much impressed by the needless suffering of the sick and wounded. At the end of the war he published a book, *Un Souvenir de Solferino*, in which he advocated the idea of pledging all nations to regard as neutrals the sick and wounded in war-time, and of a universal society to care for the disabled soldiers. Receiving the cordial support of La Société Génevoise d'Utilité Publique, of which he was a member, he secured the coöperation of the Swiss Federal Council in calling for an international conference to devise some plan for the alleviation of suffering during wars. Such a conference was held in Geneva, October 26–29, 1863, 16 governments being represented. Another was held August 8, 1864, and again 16 nations were represented. Nine "articles of the convention for the amelioration of the condition of wounded in armies in the field" were drawn up and signed, August 22, by 12 out of the 16 powers represented. Since then the number of signers has grown to 40. Each treaty nation has a society. The insignia is a red cross on a white background, chosen as a compliment to the Swiss government, whose national emblem is a white cross on a red ground, and it may be used by the national societies only or at their discretion. In 1868 the regulations were adopted for naval warfare by a conference at Paris. The society is given the privileges of neutrals, and all patients under its care have a similar privilege and are treated alike. By the terms of the treaty, the red cross must in all cases be accompanied by the banner of the country in whose service the society operates. Through the efforts of Clara Barton the United States Government became a party to the treaty, in 1882—it being the thirty-second government to subscribe to the convention—and an American Red Cross was formed, with Miss Barton as president. It was her idea that the scope of the society should be extended to work of relief in times of peace as well as war, and since its organization the timely and efficient work of the American Red Cross in cases of famine, fire, and flood, has been notable. This feature of the work has been highly indorsed by the other subscribers to the treaty. *Revised by* R.W.C.

REDDING, a city and the capital of Shasta County, northern California, on the Southern Pacific railroad, 24 miles N. of Red Bluff. Timber, lime, fruit and ore are abundant in the vicinity, and sheep are raised. The city has planing and saw mills and a foundry, banks, and two papers. Population, 1890, 1,821; 1900, 2,946.

REDEMPTIONISTS. See FELIX OF VALOIS, Vol. IX, p. 58.

REDEMPTORISTS. See LIGUORI, Vol. XIV, p. 642.

REDFIELD, a city and the county seat of Spink County, South Dakota, in the northeast-central part of the state. It lies on the Turtle River, and has a number of flour mills, iron foundries and other industrial establishments. It is the seat of a college is reached by the Chicago and Northwestern and the Chicago, Milwaukee and St. Paul railroads, and in 1900 had a population of 1,015. W.F.J.

REDFIELD, ISAAC FLETCHER, jurist, was born in Windsor County, Vermont, on April 10, 1804, and was graduated from Dartmouth College in 1825. He was admitted to the bar, and rose to eminence in his profession. He was State's attorney at Derby, Vt., in 1832–35, a justice of the supreme court of the state of Vermont in 1835–52, and chief justice of that court in 1852–60. In 1857–61 he was professor of medical jurisprudence in Dartmouth College. He removed to Boston in 1861, and became New England editor of the *American Law Register*. In 1867–69 he served in Europe as special counsel for the United States in collecting claims against Great Britain and in recovering property held there in behalf of the late Confederacy. He was the author of *The Law of Railways*, *The Law of Wills, Civil Pleading and Practice*, *The Law of Carriers and Bailments*, and *Leading American Railway Cases*. He also edited Greenleaf's *On Evidence* and Story's *Equity Pleadings* and *Conflict of Laws*. He died at Charlestown, Mass., on March 23, 1876. W.F.J.

REDFIELD, WILLIAM C., scientist; born in Middletown, Conn., March 25, 1789. His father dying when he was thirteen years old he was forced to support himself, but spent his leisure hours in reading and studying scientific works. In 1827 he settled in New York city, where he became eminent as a naval engineer. He designed a style of barges for passenger transportation, and also towboats for freight. He is, however, best known for his investigations of the causes of storms. He died in New York city, Feb. 12, 1857. G.J.H.

REDFIELD, JOHN HOWARD, botanist; born in Middletown, Conn., in 1815; son of William C. Redfield. He was long engaged with Whitney & Sons, manufacturers of car wheels in Philadelphia, and became a partner in the firm. About 1885 he was chosen conservator of the botanical branch of the Academy of Natural Science. He classified and catalogued the entire group of North American plants. He died in Philadelphia, Pa., Feb. 27 1895. G.J.H.

REDGRAVE, RICHARD, an English painter; born in Pimlico, London, April 30, 1804. He began to study from the marbles in the British Museum in 1822, and was admitted a student in the Royal Academy in 1826. A picture exhibited at the British Institution, *Gulliver on the Farmer's Table*, was his first success. In conjunction with

Mr. H. Cole he formed the Museum of Ornamental Art at Marlborough House, which enlarged under their joint charge into the Museum of Art at South Kensington. In 1851 Mr. Redgrave was named one of the jurors on the section of fine arts. The arrangements for representing British art in the Paris Universal Exhibition of 1855 were intrusted to him. In 1858 he was appointed surveyor of crown pictures. He resigned his appointment as keeper of the royal pictures and his connection with the Department of Science and Art in 1880. Among his works are *Sermons in Stones; Startled Foresters; Tranquil Waters;* and *A Well-spring in the Forest.* He died Dec. 14, 1888.

RED GROUSE OR MOOR-FOWL. See GROUSE, Vol. XI, p. 197.

REDIA. See TREMATODA, Vol. XXIII, p. 572.

RED JACKET. Seneca Indian chief; born at Old Castle, near Seneca Lake, N. Y., in 1751. His Indian name signified "Keeper Awake," but his usual appellation came from the crimson jacket given him by a British officer. He was active on the British side during the Revolution; became noted as an Indian orator; received a silver medal from Washington in 1792; informed the government of the hostile plans of Tecumseh in 1810, and took part in the War of 1812. He was opposed to Christianity, schools, and civilized arts. He died Jan. 30, 1830. G.J.H.

REDLANDS, a town in San Bernardino County, southern California, 63 miles E. of Los Angeles and 8 miles E.S.E. of San Bernardino, on a branch of the Atchison, Topeka and Santa Fé railroad. It lies at an elevation of 1,300 feet, overlooking the beautiful San Gabriel Valley; is in an agricultural, mining and especially fruit-growing region, and has sewerage and water systems, electric lights and electric street-railways. The place is famous for its fine trees. It was founded in 1888. Population 1890, 1,904; 1900, 4,797.

RED LEAD OR MINIUM. See PIGMENTS, Vol. XIX, p. 96.

RED LIQUOR. See CALICO-PRINTING, Vol. IV, p. 608.

RED MEN, IMPROVED ORDER OF. See BENEFIT SOCIETIES, in these Supplements.

RED OAK, a city and the capital of Montgomery County, southwestern Iowa, 25 miles W. of Corning and 73 miles E. of Lincoln, Nebraska, on the Chicago, Burlington and Quincy railroad. It manufactures pottery, flour, carriages, furniture, sash and blinds. Population 1890, 3,321; 1900, 4,355.

REDOUBTS. See FORTIFICATIONS, Vol. IX, p. 383.

REDPATH, JAMES, journalist, was born at Berwick-on-Tweed, Great Britain, on August 24, 1833, came to America in early life, and became a newspaper correspondent and author. Before the Civil War he was an ardent and aggressive Abolitionist, and wrote much about the free soil struggle in Kansas. Later he established a lyceum bureau for lecturers, musicians, and public entertainments, and conducted it for many years. He visited Ireland early in the Land League times, in 1880–81, and was a zealous advocate of the League. He was for a number of years a correspondent of the New York *Tribune*, and wrote it a notable series of letters on the Land League agitation. He was for a time assistant editor of the *North American Review*. Among his books are a *Handbook of Kansas*, *The Roving Editor*, *Echoes of Harper's Ferry*, *Southern Notes*, *Guide to Hayti*, *The John Brown Invasion*, *Life of John Brown*, and *Talks about Ireland*. He died on February 10, 1891. W.F.J.

RED RIVER, an affluent of the Mississippi. See RED RIVER, Vol. XX, p. 328.

RED RIVER EXPEDITION, a military undertaking of the Civil War. In 1864, after the Mississippi had been opened, an expedition was sent up the Red River, under General Banks. It was so timed as to take place during the spring freshets, and Rear-Admiral Porter accompanied Banks with 12 gunboats and 30 transports. The land forces were defeated at Sabine Cross-Roads, and retreated to Alexandria. By this time, April 8th, the water had receded, and it was found impossible to get the fleet below the rapids. The commanders were about to leave the vessels in order to save the entire force of troops, when Lieutenant-Colonel Bailey proposed to build a dam, and having received permission, on April 30th set to work and completed it by May 12th The dam on one side of the river was made of trees, and on the other of stone, iron and rubbish. A passage sixty feet wide was left in the middle of the stream, which was deep enough to float the ships, thus saving the fleet from demolition. When the dam was finished four gunboats were floated over, but it was washed away almost entirely, and had to be rebuilt before the remainder of the fleet could be brought over.

RED RIVER OF THE NORTH. The scene of another Red River Expedition to suppress a half-breed rebellion. See RED RIVER, Vol. XX, p. 328.

RED SEAWEEDS, the common name of the *Florideæ*, a group of Algæ, mostly marine. They are among the most beautiful of plants, all having some shade of red or purple, and many of them of exceeding beauty and delicacy in form, and branching. They grow in the deeper waters, and have very characteristic organs of reproduction.

RED SNOW. The appearance of snow, as seen from a distance, is often an effect of light, which adds a peculiar charm to mountain and winter landscapes, particularly in the mornings and evenings, when the rays of the sun fall most obliquely on the surface of the snow. But snow is occasionally found in both polar and Alpine regions of a really red color. Saussure observed it in the Alps, and from chemical experiments concluded that the red color was owing to the presence of some vegetable substance. The next observations on red snow were made in the Arctic expedition under Captain Ross, when it was found

extending over a range of cliffs on the shore of Baffin's Bay for eight miles, and the red color penetrating the snow in some places to a depth of 12 feet. On the return of the expedition in 1819 the coloring-matter, as then existing in the melted red snow, was subjected to careful examination by Robert Brown and by Francis Bauer, the former botanist pronouncing it to be from a unicellular plant of the order *Algæ* (see BOTANY, Vol. IV, p. 81), an opinion which has since been confirmed.

RED WING, a city and the county seat of Goodhue County, Minnesota, in the southeastern part of the state. It lies on the Mississippi River, a short distance above the head of the part of that stream known as Lake Pepin, and is an attractive place of residence and a center of commerce by both river and rail. It is 37 miles southeast of St. Paul, on the Chicago, Milwaukee and St. Paul, the Duluth, Red Wing and Southern, and the Minneapolis and St. Louis railroads, and had in 1900 a population of 7,525. W.F.J.

REDWOOD. See SEQUOIA, Vol. XXI, pp. 705, 706.

REDWOOD CITY, a city and the county seat of San Mateo County, California. It is eligibly situated on the peninsula of which San Francisco forms the northern tip, and is 23 miles south by east from that city, between the Bay of San Francisco and the Pacific Ocean. It is an attractive place of suburban residence, and is adjacent to other places of the same character, all reached by the Southern Pacific railroad. Its population in 1900 was 1,653. W.F.J.

REDWOOD FALLS, a city and the seat of Redwood County, Minnesota, in the southwestern part of that state. It lies on the Redwood River, a little before its junction with the Minnesota River, and is surrounded by an agricultural country, with some lumbering and other industries. It is reached by the Chicago and Northwestern railroad, and in 1900 had a population of 1,661. W.F.J.

REED, SIR EDWARD JAMES, was born at Sheerness, England, on September 20, 1830, and was educated for an engineering and ship-building career, which he has pursued with eminent success. He was chief constructor for the British navy for a number of years, resigning in 1870, and afterward engaged in private ship-building enterprises. He was a member of the House of Commons for Pembroke in 1874–80, and since 1880 has sat for Cardiff. He has published *Our Iron Clad Ships* (1869); *Letters from Russia in 1875* (1876); *Japan* (1880); *The Stability of Ships* (1884); *Fort Minster, M.P.* (1885); *Modern Ships of War* (1888), and *Poems* (1902). He was knighted, K.C.B., in 1880, is a fellow of the Royal Society, and has received numerous decorations from various sovereigns for his services as a naval expert. W.F.J.

REED, JOSEPH, military officer; born in Trenton, N. J., Aug. 27, 1741; was graduated at Princeton College in 1757, and admitted to the bar in 1763. He succeeded Lord Hillsborough as representative of the colonial office in December, 1772. He held this post till February, 1775, and in June of that year became aide and confidential secretary to Washington. In 1776 he succeeded General Gates as adjutant-general of the army, a post which carried with it the rank of colonel. He was elected to the Continental Congress in 1777, and took his seat April 6, 1778. He aided in founding the University of Pennsylvania and advocated gradual abolition of slavery. He died in Philadelphia, Pa., March 5, 1785. G.J.H.

REED, HENRY, educator, was born in Philadelphia on July 11, 1808, was graduated from the University of Pennsylvania in 1825, and was admitted to the bar in 1829. He entered the faculty of the University of Pennsylvania in 1831, and four years later was made professor of English literature and rhetoric, and filled that place until his death. He was a friend of the poet Wordsworth, and brought out an American edition of his works. He was the author and editor of a number of standard works, including a life of his grandfather, Joseph Reed. He was lost at sea in the wrecking of the steamer *Arctic*, on September 27, 1854. W.F.J.

REED, THOMAS BRACKETT, statesman, was born at Portland, Maine, on October 18, 1839, and was graduated from Bowdoin College with high honors in 1860. He then studied law, taught school, and was an assistant paymaster on a gunboat on the Tennessee, Cumberland, and Mississippi rivers in the Civil War. He was admitted to the bar in 1865, and in 1868 entered the Maine legislature, where he remained until made attorney-general of the state in 1870. From 1873 to 1876 he was city solicitor of Portland, and in the fall of 1877 he took his seat as a representative in Congress. In the latter place he soon won national attention by his skill in debate, and by his exercise of a biting, sarcastic humor. In the fall of 1889 he was elected speaker of the House, and in that place had a distinguished career. He was vigorous and almost arbitrary in his rulings for the suppression of disorder and mere obstruction, and secured the adoption of a new set of rules which greatly facilitated the transaction of the legitimate business of the House. Despite his partisanship he was personally one of the most popular of men, and commanded the respect of even his strongest political opponents. He remained a member of the House until 1899, when he resigned and engaged in the practice of law in New York. He died on December 6, 1902. W.F.J.

THOMAS B. REED.

REED, WILLIAM BRADFORD, diplomat, journalist and author, was a brother of Henry Reed, a grandson of Joseph Reed, the Revolutionary patriot, and son of Joseph Reed, Jr., attorney-

general of Pennsylvania and author of a work on the laws of that state. He was born in Philadelphia, was graduated from the University of Pennsylvania, and was admitted to the bar. He was attorney-general of Pennsylvania, U. S. Minister to China, and an editor of the New York *World*. He published a *Life and Correspondence of Joseph Reed*, and edited the works of his brother, Henry Reed. He died in 1876. W.F.J.

REED-BIRD. See RICE-BIRD, in these Supp'ts.

REED CITY, a post village of Osceola County, Michigan, 69 miles N. of Grand Rapids and 65 miles W. by N. of Bay City. It is situated on the Muskegon River and is at the junction of the Grand Rapids and Indiana and the Flint and Pere Marquette railroads. It has water power, and possesses grist and wood-working mills, machinery works, and other manufacturing establishments. Pop., 1900, 2,051. G.J.H.

REED ORGANS. See HARMONIUM, Vol. XI, p. 432.

REEDSBURG, a village of Sauk County, south central Wisconsin, 14 miles N.W. of Baraboo and 45 miles N.W. of Madison, on the Baraboo River, and on the Chicago and North-Western railroad. It is noted as one of the large hop markets in that region. Population 1890, 1,737; 1900, 2,225.

REEFS, CORAL. See CORALS, Vol. VI, pp. 334–337.

REES, JOHN KROM, astronomer, was born in New York City on October 27, 1851, and was graduated from Columbia College in 1872, and from the School of Mines in 1875. He was an assistant in mathematics in the School of Mines in 1873–76, professor of mathematics and astronomy at Washington University, St. Louis, in 1876–81, and since 1881 has been at Columbia College as director of the observatory, instructor in geodesy and practical astronomy, and since 1892 professor of astronomy. He was president of the New York Academy of Sciences in 1894–96, and is an officer and member of other learned organizations. He has written much for scientific periodicals. W.F.J.

REEVE, HENRY, historian; born in Norfolk, England, Sept. 9, 1813; was educated in Geneva and Munich, and, in 1837, became registrar of the Privy Council, which office he held for fifty years. In 1855 he succeeded Sir G. C. Lewis as editor of the Edinburgh *Review*. His publications include *Royal and Republican France;* translations of De Tocqueville's *Democracy in America; France before the Revolution of 1789*, and Guizot's *Washington;* a revised edition of Whitelocke's *Journal of the Swedish Embassy in 1653–54*, and Greville's *Journal of the Reigns of King George IV and King William IV*. He died in London, Oct. 21, 1895. G.J.H.

REEVE, TAPPING, jurist, was born in Suffolk County, Long Island, N. Y., in October, 1744, and was graduated from the College of New Jersey, Princeton, in 1763. He became a lawyer and was the law preceptor of Aaron Burr. In 1784 he established a law school at Litchfield, Conn., which for many years ranked as one of the foremost in America. He was a judge of the superior court of Connecticut from 1798 to 1814, and for a time its chief justice. He also served for a term in the legislature and for one in the council. He was the author of the legislation which secured to married women the control and disposal of their own property. He died on December 13, 1823. W.F.J.

REEVES, MRS. HENRY, an English novelist; born in Crewkerne, England, 1852. Her maiden name was Helen Buckingham Mathers. In 1876 she was married to Mr. Henry Reeves, a surgeon and author of *Human Morphology*. Mrs. Reeves devoted herself entirely to writing. Her works include the poem *The Token of the Silver Lily* (1876); the novelettes, *The Land o' the Leal* and *As He Comes up Stairs* (1878); and the novels *Comin' Thro' the Rye* (1875); *My Lady Green Sleeves* (1879); *Eyre's Acquittal* (1884); and *A Man of To-day* (1894).

REEVES, JOHN SIMS, an English tenor singer; born in Shooter's Hill, near London, Oct. 21, 1822. He was trained to music by his father from an early age, and at 14 became organist of North Cray Church. He also became a proficient violinist, and sometimes undertook the duty of orchestral leader. He studied harmony and counterpoint under Calcott. In his eighteenth year he made his début at Newcastle-on-Tyne Theater, as the gipsy boy in *Guy Mannering*. He obtained an engagement at the Grecian Theater, London, where he sang under the name of Mr. Johnson; but in 1847, in *The Bride of Lammermoor*, at Drury Lane, then under the management of Macready, he first showed his full powers. Although very successful, he soon left the stage for the concert-room, and in oratorio and ballad-singing achieved the highest distinction. In 1843 he studied in Paris, and afterward at Milan, where he sang at La Scala. After his return to London he soon established his reputation as the first of modern tenors. He married Miss Emma Luccombe, a well-known singer. During 1891 he gave a series of farewell concerts, but did not entirely give up concert-singing. In 1892 he became professor in Guildhall School of Music, London. He died at Worthing, Sussex, Oct. 25, 1900.

REFERENDUM. Owing to the success of the referendum in Switzerland, especially as a check on hasty legislation, the subject has been discussed freely in the United States, and clubs formed to propagate the cause. In England the Parish Councils, under the Local Government Act, was an approach toward the referendum. See VETO, Vol. XXIV, pp. 224, 225.

REFLECTING ANGLE. See *Measuring-Instruments*, under SURVEYING, Vol. XXII, pp. 754, 755.

REFLECTION OF LIGHT. See LIGHT, Vol. XIV, pp. 590–605; also WAVE THEORY, Vol. XXIV, pp. 481–484.

REFLEX ACTION. See PHYSIOLOGY, Vol. XIX, pp. 32, 33.

REFORMATORIES. The establishment of reformatories for juvenile offenders was the first important step in the classification of criminals. This plan of separating juvenile and first offenders from adult offenders and recidivists was prompted and has been widely adopted, obviously because of the greater susceptibility of the former to reformatory influences. The majority of the states have made at least partial provision for the separate confinement of the juvenile delinquents, and in most of the rest of the states like provision is being made or is contemplated. The importance of surrounding those of criminal tendencies with wholesome and helpful environment at an impressionable age, of training them to perform some useful labor and to become productive and peaceful members of society, is being more and more deeply felt. This is further witnessed in the laws of many states, which provide for the separate trial of children, for their detention pending trial, in buildings or rooms apart from adults, and for their separate conveyance to and from court.

In spite of this tendency there yet remain many youthful delinquents who are not brought within the reach of reformatory influences. Many are to be found in jails and minor prisons and in association with adult and hardened criminals, for the most part awaiting trial and still innocent before the law Indeed, more attention is given, as a rule, to the boy or girl after sentence than while awaiting trial.

The first reformatory established in the United States was the House of Refuge, Randall's Island, New York (chartered 1824), an outgrowth of the Society for the Reformation of Juvenile Delinquents. In 1890 there were in the country 58 reformatories, with a population of 14,846. To these institutions several have been added in the six years since, and there are in addition to these some private industrial schools and reformatories for wayward or incorrigible youth, which receive either by commitment from the courts or by surrender of the child by the parent or guardian.

There is a temptation common to most institutions to allow an increase of their numbers beyond the proper limits. That this temptation has been yielded to is apparent in the enormous size of some of the juvenile reformatories, in which from 400 to 2,000 inmates are accommodated. There is now a reaction in favor of small "farm" schools, such as the Lyman School for Boys at Westboro, Massachusetts; the Industrial School for Girls, Lancaster, Massachusetts, and the "Burnham Farm," New York, organized after the plan of the *Rauhe Haus*, or after the Mettray plan, where every facility is offered for training boys in farm-work and girls in household duties. This reaction is further apparent in special efforts that are made by private societies to find places for delinquent children in private families. The work of "placing out" of children of bad physical and moral surroundings, in the country on farms, has been going on for years in some of the largest cities. This work was begun with the organization of the Children's Aid Society of New York, under the supervision of that great philanthropist, Charles L. Brace, and through it and kindred societies in Boston, Philadelphia and elsewhere, more than a hundred thousand boys and girls have been transplanted from a debasing environment to a wholesome one. Very few of the children sent to the country return to the city, and a very hopefully small percentage are ever chargeable on the community or commit criminal offenses. This preventive work must be reckoned among the first of reformatory influences among those who are criminal in their instincts or are in vicious and degrading environment. The statistics of crime in New York show a decided improvement in the matter of juvenile delinquency since the organization of these children's societies.

In this connection should be mentioned the work of such societies as the Children's Board of Guardians and the Societies for the Prevention of Cruelty to Children (q.v., in these Supplements), which are empowered to take children out of morally bad homes and to place them in better surroundings. The Children's Board of Guardians in the state of Indiana is a good example of the former type of organization, and the New York Society for the Prevention of Cruelty to Children of the latter.

The relative increase of juvenile delinquency, according to census returns, has been comparatively slight in the last decade, but these statistics cannot with safety be made the basis of any generalization, for the reason that there are so many causes that have an influence upon the result. The number in 1880 was 11,468 and in 1890, 14,846. The average age of all inmates of juvenile reformatories in the United States in 1890 was 14.23 years. Only a little more than three per cent could neither read nor write. Less than one half of one per cent had acquired a full knowledge of a trade, and less than three per cent appeared to be apprenticed to a trade. A very large percentage of the inmates of juvenile reformatories is engaged in some occupation while in confinement, but the labor is not with a view to profit as much as to training and preparation for life. At least half of the time is usually spent in the school-room.

Reformatories are now being established for older offenders, and existing prisons and penitentiaries are being converted into reformatories. (See PRISONS, in these Supplements.) This has been done in appreciation of the fact that older offenders are also susceptible to reformatory treatment, and that reformation, the primary object in the imprisonment of juvenile delinquents, may also successfully be made the chief object in prison discipline for older criminals. The tendency seems to be in the direction of providing institutions of a reformatory character for all who are capable of reformation, and places of custody for those who can never safely be returned to society again. This, at any rate, is the plan advocated by the foremost penologists, and the

institutions of the land are gradually responding to their ideas. See also REFORMATORY AND INDUSTRIAL SCHOOLS, Vol. XX, pp. 350–352.

JOHN H. FINLEY.

REFORMED CHURCH IN AMERICA, formerly known as Reformed Protestant Dutch Church in North America; was planted in the United States by members of the Reformed Church of Holland, where its first synod met and adopted confessions at Antwerp in 1563. The mother-church was presbyterian in government and Calvinistic in doctrine. This church adheres to the Apostles', the Nicene and the Athanasian creeds, the Belgic Confession and the Canons of Dort. The *Heidelberg Catechism* is expounded in the pulpit, taught in the homes, and is an authoritative manual of religious instruction. The government of a congregation or parish is by elders and deacons, elected for two years. These form a consistory having power to call a minister, and with him to receive and dismiss members. They also act as trustees of the church property. Ex-deacons and elders form what is called the "great consistory," an advisory body. One elder, together with the minister from each church in a convenient district, form what is termed a classis, an ecclesiastical body having spiritual charge of the district. Four ministers and four elders from each classis of a larger territory form a particular synod, and similar representatives from each classis, the number proportioned to the size of the classis, form the *general synod*, an ecclesiastical body that finally adjudicates any dispute on spiritual matters that arises either in the churches, or in the classes, or in the particular synods. For an account of the origin and early history of this denomination in the United States, see PRESBYTERIANISM, Vol. XIX, pp. 696–716, 718, 719, 720.

IN 1628 the Dutch settlers of New Amsterdam organized a congregation that worshiped in a loft over a horse-mill. Previously their religious instruction was cared for by schoolmasters, sent out by the West India Company. In 1635 a wooden church was built in Old Slip, and eight years later a substantial edifice was erected in the fort that stood near Bowling Green, and it was named in honor of St. Nicholas. In 1693 a third church was built in Garden Street, which became the first of the collegiate churches, when, associated with it, a new congregation was organized, and in 1729 began to worship in a new building that stood on the corner of Nassau and Cedar streets, where now the office building of a life-insurance company rears its lofty walls. This was known for a time as the Middle Dutch Church, though subsequently it came to be known as the South Church. Its large gray stone building was a British riding-school and prison during the Revolutionary War; from 1844 to 1877 it was the government post-office. The North Church joined the college in 1769, and its site was on Fulton Street. All these structures have disappeared with the northward march of New York society, but the collegiate organization still exists and its board of trustees maintain (1896) six churches and chapels in the city, each of them notable for the dignity and beauty both of their buildings and services. The consistory of the city at that time comprised 27 churches.

This wealthy denomination has extended itself through regions occupied by the descendants of the Dutch colonists, and its strength lies in the towns of the Hudson River and Mohawk valleys, and in those of northeastern New Jersey. It was not until 1767 that the Collegiate Church substituted English for Dutch in its public services. Twenty-two years later an English hymnody came into use. The hymnal is under the control of the general synod, and is a fine collection of lyrics full of refined devotion. The denomination must be classed among liturgical churches, as it provides forms of worship for public services, the use of which is optional, and offices for the sacraments, ordination and discipline, the use of which is imperative. The scholars' black-silk gown is in common use by the pastors when officiating.

Classes of this denomination exist in Philadelphia and in the states of Michigan, Illinois, Wisconsin, Iowa and Dakota. Its church property was valued in 1890 at $10,340,000.

Besides the general synod there were in 1895 four particular synods and 34 classes. There were 618 individual churches, 652 pastors and a total membership of 117,260. In their Sunday-schools, which numbered 894, there were 117,210 pupils. The total amount contributed for congregational support was $1,022,206, and for benevolent purposes $311,516. For foreign missions the sum of $80,859 was given, the church maintaining missions in the Madura district in India, in Japan, in China and in Arabia. The most important missions are at North and South Arcot, Madura, founded in 1854, the center of some 117 out-stations, and having a large corps of native pastors, schoolmasters, catechists and readers. A theological seminary is also maintained in connection with the Arcot mission.

Several attempts have been made to effect a union between the Dutch Reformed and the German Reformed churches in America. Committees from the general synods of the Dutch and of the German Reformed Church met in 1890 and drafted a plan of federation, but after considerable discussion the matter was dropped in 1894. This church is one of the constituents of the General Alliance of Reformed churches holding to the presbyterian system.

Four colleges and three theological seminaries are conducted under the auspices of the denomination. The colleges are: Rutger, at New Brunswick, New Jersey; Hope, at Holland, Michigan; Northwestern Classical Academy, at Orange City, Iowa; and Pleasant Prairie College, at German Valley, Illinois. The seminaries are at Rutgers, at Hope, and one in India. Rutgers Seminary was organized in 1785, and had in 1894, 5 professors and 42 students, a scholarship fund of $111,071, a general fund of $400,000 and a library of 43,000

volumes. Hope College had, in its theological department, 3 professors and 22 students. The seminary at the Arcot mission, India, under W. W. Scudder, had 15 students. The weekly periodical issued as the organ of the denomination is the *Christian Intelligencer* (New York).

REFORMED CHURCH IN THE UNITED STATES, formerly known as the German Reformed Church, had its origin among the early immigrants who were adherents of the Reformed Church of Germany, and began to settle in Pennsylvania about 1684. True to the doctrines of the mother-church, they early adopted and have ever since retained the Heidelberg catechism as their rule of faith and their only binding authority in matters of doctrine. This catechism, which was prepared by certain professors in Heidelberg University, and first published in 1563, teaches the natural depravity of man; salvation by grace; spiritual presence in the symbols of the Lord's Supper; baptism of infants; election of grace; but it discards the dogma of reprobation. No images are to be tolerated in the churches; the church order is presbyterian. The first independent church established by this denomination was presided over by Rev. John Philip Boehm, who began to preach in what is now called Boehm's Church, Montgomery County, Pennsylvania, in 1720. In 1727 the first Reformed Church of Philadelphia was founded, under the pastorate of George Michael Weiss. Churches were also founded in New York and as far south as South Carolina. All these were connected with and under the supervision of the classis, in Holland, of the Dutch Reformed Church, until in 1793 independence was effected by the organization of a synod. There were then in all about one hundred and fifty churches. In 1824 the synod of Ohio was formed. The general synod was not formed until 1863. The synods are composed of representatives of the classes, the same as in the Dutch Reformed Church, the general synod meeting once in three years and exercising advisory and supervisory powers. Among the educational institutions conducted under the auspices of the denomination are the college and seminary at Mercersburg, Pennsylvania, founded at Carlisle in 1835; Franklin and Marshall College, at Lancaster, Pennsylvania; Ursinus College and Seminary, at Collegeville, Pennsylvania; Catawba College, at Newton, North Carolina; Heidelberg University, at Tiffin, Ohio; Calvin Institute, at Cleveland, Ohio; Palatinate College, at Myerstown, Pennsylvania; and a theological seminary at Howard's Grove, Wisconsin. At the beginning of 1895 there were 8 synods, 55 classes, 1,646 congregations, with an aggregate membership of 221,473. The Reformed Church publishes 29 periodicals, 23 in English and 6 in German; supports foreign missions in Japan and in India, and sustains many home missions among the Indians and among recent or impoverished immigrants from Europe. See under PRESBYTERIANISM, Vol. XIX, pp. 717–721.

REFORMED EPISCOPAL CHURCH, the name of a religious body in the United States, which separated from the Protestant Episcopal Church in December, 1873, under the leadership of Bishop G. D. Cummins, who up to this date had been bishop of Kentucky in the older church. For two generations there had been much irritation existing between the Low and High Church parties of the Episcopal denomination. About the time of the general convention of 1868 the rancor of this dissension culminated in several ecclesiastical trials of evangelical clergymen, Mr. Cheney being deposed from the ministry and Mr. Tyng publicly reprimanded, ostensibly for violations of the canons, but none the less for acts expressing their evangelical views. In the autumn of 1873, during a session of the general convention, Bishop Cummins participated in a meeting of the Evangelical Alliance of New York, and especially shared in administering the rite of the Holy Communion. Although not disciplined in his own church for this act, he felt that he encountered estranged friends and the obloquy of associates. Accordingly he resigned his jurisdiction, called about him a small body of sympathizers, clerical and lay, organized a church of this title, in New York, on the 2d of December, and published a declaration of its principles. This denomination adheres to episcopacy, not as a divine right, but as an ancient and desirable form of church polity. It adheres to the doctrines of faith as set forth in the thirty-nine Articles and in the Apostles' Creed; it recognizes the Holy Scriptures as the sole rule of faith and practice; it retains a liturgy which is practically a revision of the Proposed Book of Common Prayer published by the first convention of the Episcopal Church in 1785. (See PROTESTANT EPISCOPAL CHURCH, in these Supplements.) This denomination rejects the notion that the church of Christ exists only in one order or form of polity; that Christ's ministers are priests in any other sense than as all believers are; that the Lord's table is an altar on which the body and blood of Christ is offered perpetually to the Father; that the presence of Christ in the eucharist is to be found in the elements; and that spiritual regeneration is inseparably dependent upon baptism.

The governing body of this church is styled the General Council. It first met in 1874, in New York. In this council bishops, clergymen and laymen meet without separation of orders. In it is vested authority over all Episcopal parishes in America. Under this supreme body are the synods of Canada; New York and Philadelphia; and Chicago; also missionary jurisdictions of the Pacific; two of the South, one being for colored persons; and one of the West and Northwest.

In 1877 a branch of this church was established in Great Britain, but in 1883 the branch obtained an independent existence. In 1894 it merged in the Reformed Church of England.

Bishop Cummins was presiding bishop of this denomination until his death in 1876. His successors in this position have subsequently been chosen from time to time in each general council.

In 1894 this church comprised 8 bishops, 90 presbyters, 112 parishes and missions, and about 11,000 communicants, and held property valued at $1,500,000. It has one theological seminary, in Philadelphia.

REFORMED PRESBYTERIAN CHURCHES in the United States owe their origin to the Scotch Covenanters (q. v., Vol. VI, p. 470), who held to such a belief in the kingship of Christ, that any form of human government that did not distinctly recognize the superior sovereignty of God could not receive their conscientious support. Adherents to this faith, who began emigrating to America in the early part of the eighteenth century, founded churches based upon such an adherence to the general presbyterian system as is common to all lands, and especially affirming the headship of Christ. The dissensions and disruptions that afterward occurred were mainly caused by a more or less rigid interpretation of this important article of faith. The Associate Presbytery of Pennsylvania, organized in 1753, and that of New York, organized in 1776, together with the Covenanters who had organized the Reformed Presbytery in 1774, united in 1782 to form the Associate Reformed Synod of North America. Many of the individual members of the first-named bodies, suspecting laxity of faith, refused to join, and reorganized the Associate Presbytery and the Reformed Presbytery; the latter body condemns instrumental music in churches, and still adheres to the use of the old Scotch version of the Psalms for congregational singing. A Reformed Dissenting Presbytery was also formed, which, however, seems to have been discontinued or merged in other bodies.

The reformed presbyteries organized a synod in Philadelphia and a general synod in 1823. They taught adherence to the Westminster Confession, with the proviso that anything which seemed to sanction any power in civil magistrates over ecclesiastical affairs be omitted. Ten years later came the great disruption into New Lights and Old Lights, or those who believed it right to vote and accept office under the Constitution of the United States, and those who refused thus to sanction any government that had not "God in the Constitution." The divided bodies have since been known as the Reformed Presbyterian Church in North America and the Reformed Presbyterian Church in the United States; the latter represented by the synod, which in 1895 numbered about 10,000 communicants and 116 churches, the former by the general synod, which the same year numbered 4,700 communicants.

In 1840 the Reformed Presbyterian Covenanted Church was formed by seceders from the Reformed Presbyterians, and in 1883 the Reformed Presbyterian Church of the United States and Canada was formed through a division among the members of the general synod. The Associate Reformed Presbyterians formed in 1802 a general synod, from which the Carolina synod withdrew in 1821, forming the Associate Reformed Synod of the South, which in 1895 numbered 10,088 communicants. The Associated Reformed Presbyterians became merged in 1858 into the United Presbyterian Church (q.v.). See also under PRESBYTERIANISM, Vol. XIX, pp. 717–721.

REFRACTOMETER. Various instruments for widely different purposes are known by this name. One type consists of two telescopic tubes, between which a liquid may be placed, and the degree of its refraction tested by observing a light through the telescopes, and noting the angle at which they are set to bring the light into vision. (See DENSIMETER, in these Supplements.) Another form is the interference refractometer, which is a complex affair of mirrors and prisms, which reflect the light so that interference-fringes are produced. By observing the position and varying intensity of these fringes, minute measurements of extreme accuracy are possible. It has been used much in studying the lines of the spectrum, though originally employed to obtain indices of refraction. An ophthalmic refractometer has been devised for determining the necessary correction of distance vision, which is not easily obtained with the ophthalmometer, which measures only the limits of distinct vision. If the eye errs in refraction, the image is not formed exactly in the retina, and it is important that the oculist should know whether this image is formed in front of or behind the retina, that he may judge what sort of lenses will correct the error. The operation of discovering this with the ophthalmometer is very tedious, but the refractometer in question is provided with a series of lenses so mounted on the periphery of disks that a great variety of combinations is possible. By a little experimenting with these the proper combination of lenses is found, and the visual error may be corrected by providing the patient with lenses of similar quality.

C. H. COCHRANE.

REFRIGERATING APPARATUS. Refrigeration by the ammonia-expansion system is theoretically about forty per cent cheaper than the maintenance of a low temperature with manufactured ice; that is to say, the refrigerating capacity of such machinery is forty per cent greater than the ice-making capacity. As a consequence, where artificial cold is required in large quantity a refrigerating plant is used. About 1889 Denver and St. Louis were supplied with large plants for the delivery of cold through pipes, as heat is served. Numerous other cities are supplied similarly now. At the central station ammonia is liquefied by compression, acquiring much heat during the process. Then it is cooled and sent out through a main called the "liquid line" to the customer, in whose place are expansion coils very similar in appearance to steam radiators. The liquid ammonia, being let into an expansion coil through a valve in a very small stream, begins to evaporate, and in so doing absorbs heat and reduces the surrounding temperature. When it is evaporated and its cooling work is completed, it returns to the central station through another pipe called the "vapor line,"

a suction-pump assisting it on its return journey. A third pipe, called the "vacuum line," is essential to the proper working of the system. It is connected at intervals with the other lines, which are built in sections, and in case any repairs are required, any section may be shut off pumped out by the vacuum line and then receive the necessary attention. The vacuum line may also be used as a by-pass at times. When a section is pumped out in this way the workmen who open the pipes are not in the slightest danger from ammonia fumes, as the exhaustion is so perfect that not even the smell of it remains.

The laying of the pipes for a refrigerating system requires especial care. The customary plan is to make the pipe in half-sections. The lower halves are laid in a bed of concrete and thoroughly tested for leaks before the upper half is put on. A cement joint is then made between the two parts and the whole thoroughly protected and surrounded with cement. Manholes are placed at the ends of sections, with valves for shutting off the pipe. One advantage of this system is, that no cold is lost by expansion of the ammonia on the route. The ammonia is kept under pressure and in liquid form until it reaches the customer, and does not deliver its cold until it begins to vaporize in the expansion coils. Customers who require ice, as for table use, are supplied with small brine-tanks, in which they can place cans for ice to form. Artificial cold is purchased for the warehouses where fruit, meats, etc., are kept in cold storage, by hotels and restaurants for lowering the temperature of their rooms in summer, and by the public in general for miscellaneous purposes. See ICE-MACHINES, in these Supplements.

C. H. COCHRANE.

REGATTA. See ROWING, Vol. XXI, pp. 36–38.

REGELATION. See ICE, Vol. XII, p. 647.

REGENERATION. See BAPTISM, Vol. III, p. 301.

REGIMENT. See ARMY, Vol. II, pp. 494, et seq.

REGINA, a town in the district of Assiniboia and the capital of the Northwest Territory, on the Canadian Pacific railroad, 357 miles W. of Winnipeg. It is the center of a rich wheat-growing and grazing region. Population 1891, 1,681; 1901, 2,645.

REGULATOR, ELECTRIC. Many forms of resistance-boxes are made for regulating electric currents for use as equalizers, stage regulators, storage-battery regulators, etc. The common pattern involves a box containing a set of spiral resistance-wires, in which wire is economized by the use of special switches to distribute the current through the resistance-conductors. One lever is arranged so that its insertion in full secures the maximum ampere-carrying capacity, with the least resistance. As this lever is withdrawn the resistance is increased, the different coils being released one at a time. Another lever is supplied for further increasing the resistance as it is withdrawn by placing the spirals in series. This combination secures a regulator having maximum ampere capacity on the first step, with the spirals all in multiple, and a maximum resistance on the last step, with the spirals all in series. As a rule, the spirals of a resistance-box should be placed in a horizontal position, as they will lose heat by convection more rapidly in an upright position than when horizontal. Spirals are made from tinned iron, galvanized iron, and from German silver. The usual method of forming them is to wind on a mandrel and afterward stretch slightly to separate the convolutions.

C. H. COCHRANE.

REHAN, ADA, an American actress; born in Limerick, Ireland, April 22, 1860. When six years old she removed to America with her father and made her début at the age of 16 at Albany, New York, in *L'Assommoir*. After playing with Edwin Booth she was engaged in 1879 by Augustin Daly; went to London with his company in 1884, and achieved great success as Katherine in *Taming of the Shrew*, in 1888. She appeared in plays of Shakespeare and Tennyson in 1893. Among her other successful characters are Maid Marian in Tennyson's *Foresters*, and the leading rôles in *The Railroad of Love* and *The Squire*.

ADA REHAN.

REHOBOAM. See ISRAEL, Vol. XIII, p. 416.

REICHENBACH, CARL, BARON, a German chemist (1788–1869). See MAGNETISM, ANIMAL, Vol. XV, p. 280.

REID, SAMUEL CHESTER, naval officer, was born at Norwich, Conn., on August 25, 1783, and at the age of eleven years entered the navy. He was a captain and commander of the brig *General Armstrong* in the War of 1812, and was the hero of a famous fight at Fayal, in the Azores, where his vessel was attacked by three British ships. After a desperate struggle he scuttled his ship and with his surviving comrades escaped to the shore. Captain Reid founded the signal telegraph stations in New York harbor and the Sandy Hook pilot boat system, and suggested the retaining of thirteen stripes in the American flag and the addition of a new star for each new state. He died on January 28, 1861. W.F.J.

REID, SIR THOMAS WEMYSS, an English journalist; born in Newcastle-on-Tyne in 1842. He was educated at Newcastle; became a journalist in 1861; in 1864 was appointed editor of the Preston *Guardian*, and in 1870–87 editor of the Leeds *Mercury*. He contributed largely to the leading reviews and magazines. He published *Charlotte Brontë: A Monograph* (1877); *Gladys Fane: A Story of Two Lives* (1883); *Mauleverer's Millions* (1885); *Life of the Right Hon. W. E. Forster* (1888); *Cabinet Portraits*, sketches of leading statesmen of both parties (1872);

Politicians of To-day (1879); and *The Land of the Bey* (1882), a narrative of a visit to Tunis during the military operations of France. He also contributed to the Leeds *Mercury* an extensive series of literary and social essays, under the title of *The Rambling Philosopher*, as well as letters descriptive of travel in various parts of the world. In 1887 he resigned the editorship of the Leeds *Mercury* and accepted the post of manager of the publishing-house of Cassell and Company. In 1890 he became editor of *The Speaker*, a weekly review. In 1891 he published a life of the late Lord Houghton, in 1902 a life of Wm. Black, the novelist, and in 1894 was knighted. He contributed the article on LEEDS to this ENCYCLOPÆDIA. Died Feb. 26, 1905.

REID, WHITELAW, journalist and diplomat, was born at Xenia, Ohio, on October 27, 1837, and was graduated from Miami University in 1856. He was a "stump speaker" in the presidential campaign of 1856, for Fremont, and edited the Xenia *News* in 1858–59. In 1860–61 he was legislative correspondent of the Cincinnati *Gazette*, and in 1861–62 was its war correspondent, his letters over the signature "Agate" commanding wide attention as among the best published during the war. In 1862–68 he was correspondent of the *Gazette* at Washington, and served also as clerk of the House Committee on Military Affairs, and as librarian of the House of Representatives. He was a cotton planter in Louisiana in 1866–67. In 1868, at the invitation of Horace Greeley, he joined the editorial staff of the New York *Tribune*, in 1879 became its managing editor, and in 1872 succeeded Mr. Greeley as editor-in-chief and also as principal proprietor. He declined appointment as minister to Germany in 1877 and again in 1881, but was minister to France in 1889–92, special ambassador to Queen Victoria's jubilee in 1897, and a member of the commission which negotiated the treaty of peace with Spain at Paris in 1898. He was the Republican candidate for the Vice-Presidency of the United States in 1892. In 1878 he was elected (for life) a regent of the University of the State of New York, and upon the reorganization of that board in 1904 he was made its chancellor. He is the author of *After the War, a Southern Tour* (1876); *Ohio in the War* (1868); *Schools of Journalism* (1870); *Newspaper Tendencies* (1874); *Town Hall Suggestions* (1881); *Two Speeches at the Queen's Jubilee* (1897); *Some Consequences of the Last Treaty of Paris* (1899); *Our New Duties* (1899); *Later Aspects of Our New Duties* (1899); *A Continental Union* (1900); *Our New Interests* (1900), and *Problems of Expansion* (1900). W.F.J.

WHITELAW REID.

REIDSVILLE, a town of Rockingham County, North Carolina, near the center of the "northern tier" of that state. It lies in the fine uplands near the head of the Cape Fear River, and is reached by the Richmond and Danville railroad. Its population in 1900 was 3,262. W.F.J.

REIGN OF TERROR. See FRANCE, Vol. IX, pp. 534–536.

REIN, WILHELM, a German pedagogue; born at Eisenach, Aug. 10, 1847. After studying at Jena, Heidelberg and Leipsic he became in 1876 director of the Eisenach Normal School, and in 1886 professor of pedagogics and director of the training school for teachers at the Jena University. He published with Pickel and Scheller *Theorie und Praxis des Volksschulunterrichts nach Herbartschen Grundsätzen* (1886–1901); and alone *Pädagogik im Grundriss* (1900); *Grundriss der Ethik* (1902); *Pädagogik in Systematischer Darstellung* (1902); *Geschichte der Methodik des Deutschen Volksunterrichts* (1889). G.A.S.

REINDEER. See DEER, Vol. VII, pp. 23, 24.

REINDEER-MOSS. See LICHENS, Vol. XIV, p. 563.

REINHART, BENJAMIN FRANKLIN, artist, was born in Greene County, Penn., on August 29, 1829, and studied art at Pittsburg and in the National Academy of Design, New York. He took to portrait painting with some success, but in 1850 went to Europe for further study, at Düsseldorf, Paris and Rome. In 1861–68 he was in England. In 1871 he was elected an associate of the National Academy. Among his best known portraits are those of James Buchanan, George M. Dallas, Charles P. Daly, Charles O'Conor, the Princess of Wales (now Queen), Lord Brougham, Thomas Carlyle, Tennyson, Mark Lemon, Edwin M. Stanton, General Scott, Stephen A. Douglas, and Samuel Houston. His historical and other works include *Katrina Van Tassel*, *Washington Receiving the News of Arnold's Treason*, *Young Franklin and Sir William Keith*, *Pocohontas*, *Evangeline*, and *Cleopatra*. He died on May 3, 1885. W.F.J.

REINHART, CHARLES STANLEY, artist, nephew of Benjamin Franklin Reinhart, was born at Pittsburg, Penn., on May 16, 1844. During the Civil War he served in the transportation department of the U. S. army, with the Army of the Potomac, and in 1868 he went to Europe to study art. In 1870 he returned to the United States and entered upon a distinguished career as an illustrator of books and periodicals. He was also an accomplished artist in colors. He received honorable mention at the Paris Salon of 1887, a gold medal at the Philadelphia Academy in 1888, a silver medal at the Paris Exposition of 1889, and two medals at the Chicago Columbian Exposition of 1893. He was an associate of the National Academy, and a member of the Society of American Artists, the American Water-Color Society, and the New York Etching Club. He died on August 30, 1896. W.F.J.

REINKENS, JOSEPH HUBERT, the first Old Catholic bishop; born at Burtscheid, near Aachen, March 1, 1821; became in 1853 professor of church history at Breslau; retired in 1858. On his writ-

ing *The Papal Infallibility* and on his protest against the Vatican Council he, in 1870, was suspended *ab ordine*, and in 1873 elected a bishop of the German Old Catholic Church, with his residence at Bonn. He died there Jan. 4, 1896. He wrote *Die Lehre des Heiligen Cyprian von der Einheit der Kirche* (1873); *Revolution und Kirche* (1876). G.A.S.

RELEASE, in law, is the act of relinquishing a claim or right to the person against whom it is held. It may consist of a discharge of a right of action, or the conveyance of one person's interest in an estate to another who has possession thereof. In the former class, a mere right is abandoned, as the right to claim damages for breach of contract, or the like. In the latter, an interest is conveyed, as in case of the release of an interest in real estate created by mortgage. A release may be expressed or implied, or it may be by operation of law, as when one does an act which the law considers inconsistent with an intention to retain the right. Thus when one releases one of several joint obligors, the others are released by operation of law. A quit-claim deed, as used in the United States, is in the nature of a release of title. See QUIT-CLAIM, in these Supplements.

RELIEFS. See SCULPTURE, Vol. XXI, p. 582 et seq.; MURAL DECORATION, Vol. XVII, pp. 40, 41.

REMENYI, EDOUARD, a Hungarian violinist; born in Hungary, in 1830. He studied at the Conservatory of Vienna, under Joseph Böhm, from 1842 to 1845; took part in the insurrection against Austrian rule in 1848, and was compelled to leave the country. He made several tours throughout the United States, the last being in 1893, and he played in all parts of the world. His playing, which had a gipsy dash and fire to it, combined with mastery of technique, was exceedingly popular. He died in San Francisco, May 15, 1898.

REMEY, REAR-ADMIRAL GEORGE C., late commandant of the Navy Yard, Portsmouth, N. H., and at present in charge of the United States naval squadron in Chinese waters, was born at Burlington, Iowa, Aug. 10, 1841, and graduated at the U. S. Naval Academy. In 1859 he was attached to Hartford, East India squadron, made commander in 1872, captain in 1885, commodore in 1897. In 1862–63 he served with both the North and the South Atlantic blockading squadrons, and was present at the assault on Fort Sumter, where he was taken prisoner. After the war he served in several branches of the service and on various naval stations, and in the war with Spain commanded the naval base at Key West, Fla. In 1900, he was placed in charge of the U. S. war fleet on the Asiatic station during the Boxer uprising in China, which was largely strengthened by the addition of several formidable sea fighters.

REMSEN, IRA, chemist and educator, was born in New York on February 10, 1846, and was graduated from the College of the City of New York in 1865, and afterward from the College of Physicians and Surgeons, New York, and from the University of Göttingen, Germany. He was professor of chemistry in Williams College in 1872–76, became professor of chemistry in Johns Hopkins University in 1876, and was made president of that institution in June, 1901. He was the founder, in 1879, of the *American Chemical Journal* and has since been its editor. He has written a number of standard treatises and text-books on chemistry. W.F.J.

REMINGTON, FREDERICK, an American artist and illustrator; born in St. Lawrence County, New York, Oct. 4, 1861. He studied at the Yale Art School for two years, and in 1880 went to the Western cattle-ranges of Montana and Wyoming, and during the next four years lived the life of a genuine cowboy, which served to give him subjects for many of his sketches, and taught him the details of horses, Indians, and the men of the plains. In 1884 he sent to Harper and Brothers, New York, a number of drawings illustrating Western scenes which were immediately accepted for their originality and freshness. He afterwards illustrated several articles for Theodore Roosevelt, and some of his own. He traveled all over North America, and in various parts of Europe and northern Africa. He did some work in painting, and was elected an associate of the National Academy of Design. Among his better-known paintings are *The Dash for the Timber; The Last Stand; Past all Surgery; The Last Lull in the Fight;* and *Conjuring the Buffalo Back.* Added to his illustrative and artistic labors, his work as a sculptor places him in a peculiar position among American artists. His bronzes have attracted general attention; among them are *The Broncho Buster* and *The Wounded Bunkie.* His latest illustration is that of General Miles's *Personal Recollections* (1896). Mr. Remington published a volume, *Pony Tracks*, descriptive of his frontier experience.

RENAN, JOSEPH ERNEST, a French savant and Orientalist; born at Tréguier, Brittany, Feb. 27, 1823. He was a pupil of the celebrated Abbé Dupanloup, and was intended originally for the church. In 1845, however, his increasing scepticism and independence of thought culminated in his abandoning all thoughts of the church as a profession. At this supreme crisis of his life, his sister Henrietta, to whom Renan has paid the highest tribute of brotherly affection, proved an invaluable friend and counselor. By her assistance he was placed in a position in which he could follow out that purpose which had been gradually shaping itself in his mind — a life of study untrammeled by creeds or formularies. Thenceforward Renan's life was the uneventful one of the scholar. In 1848 he gained the Volney prize for a memoir upon the Semitic languages. His work, entitled *Étude de la Langue Grecque au Moyen-âge*, published in 1845, was crowned by the Institute. In 1849 he was sent to Italy on a literary mission by the Académie des Inscriptions et Belles-Lettres; in 1851 was attached to the department of manuscripts in the Bibliothèque

ERNEST RENAN.

Nationale, and in 1856 was elected a member of the Académie des Inscriptions in place of M. Augustin Thierry. At the end of 1860 he was sent on a mission to Syria. In 1862 he was appointed professor of Hebrew, but did not permanently occupy the chair, in consequence of opposition to his radical views on religion. In 1863 he published his well-known *Vie de Jésus*, the result being that the author was dismissed from his professorship. M. Duruy, the Minister of Public Instruction, endeavored to conceal the significance of this dismissal by giving him an office in the Bibliothèque Imperiale; he, however, strongly protested against the appointment, which was revoked June 11, 1864. At the elections to the Corps Législatif in May, 1869, he was an unsuccessful candidate. M. Renan was elected a member of the French Academy, June 13, 1878. He attended the congress of Orientalists held at Florence in September, 1878. In addition to the works already mentioned, he published numerous memoirs on comparative philology, and of a literary character. He was twice professor of Oriental languages in the College of France. In 1880 he received the cross of the Legion of Honor, becoming grand officer in 1888. He married a niece of the famous painter, Ary Scheffer.

Of the long list of Renan's works, the best known is undoubtedly his *Life of Jesus*, in which his rationalizing views, qualified by mysticism touching the sublime character of love and duty, find strong expression. This book forms a part of his *Histoire des Origines du Christianisme*, of which the other volumes are *Les Apôtres* (1866); *Saint Paul* (1867); *L'Antechrist* (1873); *Les Évangiles et la Seconde Génération Chrétienne* (1877); *L'Église Chrétienne* (1878); and *Marc-Aurèle et la Fin du Monde Antique* (1880). Between 1887 and 1891 three volumes of his *History of Israel* were given to the world. A fourth volume of this work completed the author's plan.

The estimates of Renan's work have been various, and, as in the case of all writers on theological subjects, mostly influenced by the prejudices of the critics. His *Jesus* was the creation of an erudite fancy, made attractive by the literary artist and the charm and gracefulness of his diction. There was a good deal of the epicurean in his philosophy, but despite that he was highly intellectual, as well as sincere and earnest. His later writings, in addition to *L'Histoire du Peuple d'Israël* (4 vols.), above mentioned, include *Recollections of his Youth* (1883); *Le Prêtre de Némi* (1885); *L'Origine de la Bible* (1886); *L'Abbesse de Jouarre* (1887); the Hibbert lectures delivered in London in 1880, on *The Influence of the Institutions, Thought and Culture of Rome on Christianity; L'Avenir de Science* (1891); *Examen de Conscience Philosophique* (1889); *Discours et Conférences* (1887); *Feuilles Détachées*; and *Recollections and Letters* (1892). See *Memoir and the Letters of Ernest and Henrietta Renan* (trans., 1895). He died in Paris, Oct. 2, 1892.

RENDEL, Sir Alexander Meadows, an English civil engineer; born in England in 1829; the eldest son of James Meadows Rendel. He was educated at Canterbury and Cambridge, and studied engineering under his father; in 1856, became engineer to the Leith Harbor and Dock Company, the London Dock Company, the East India railway, and other companies; and was consulting-engineer to the Secretary of State for India.—His brother, George Whitwick Rendel, also a civil engineer; born in England in 1832; was educated at Harrow, and studied engineering in the office of his father, whose assistant he was for some time; joined the Armstrong firm, as manager of the ordnance department at Elswick; designed and carried out a system of hydraulic machinery for working heavy guns; designed numerous gunboats; was a member of several commissions, especially the one appointed in 1871 to settle the types of English ironclads; was Civil Lord of the Admiralty from 1882 to 1885; and a member of the Institution of Civil Engineers.—His brother, Stuart Rendel, Lord of Hatchlands, likewise a civil engineer; born in 1834; was educated at Oxford, and was called to the bar in 1861; a member of the Armstrong and Whitworth committee for experiments in artillery (1861–63), and became a member of the Armstrong firm in 1870. In 1880 Mr. Rendel was sent to Parliament, where he was continually until 1894; in 1886 was chosen first president of the North Wales Liberal Federation; and in 1887 first president of the Welsh National Council. In 1894, on Gladstone's retirement from office, Rendel was created Baron of Hatchlands. His chief engineering-works were in connection with the harbors of refuge at Holyhead and Portland.

RENO, a city and the capital of Washoe County, northwestern Nevada, 17 miles N.N.W. of Virginia City, on the Southern Pacific, the Carson and Colorado, the Virginia and Truckee, and the Nevada-California-Oregon railroads, and on the Truckee River. It is an agricultural and mining region, and has a considerable trade. Located here are a high school, two public libraries, a national bank with a capital of $200,000, the Bishop Whitaker School for Girls and Nevada State Uuiversity. The last is a non-sectarian, co-educational institution, founded in 1886, which, in 1896, had 21 instructors, 304 students, and 4,000 volumes in its library. Population 1890, 3,563; 1900, 4,500.

RENO, Jesse Lee, soldier, was born at Wheeling, West Va., on June 20, 1823, was graduated from West Point in 1846, served gallantly in the Mexican War, received two brevet promotions for services at Cerro Gordo and Chapultepec, and was seriously wounded at the latter place. He entered the Civil War as brigadier-general of volunteers and became major-general. He led a brigade under Burnside at the capture of Roanoke Island and New Berne, commanded a division in that department for a time, and then served under General Pope at the second Bull Run and at Chantilly. At Turner's Gap, near Sharpsburg, Md., three days before Antietam, he repulsed Lee's army, but perished in the achievement. He was in action all day, and had finally turned the tide of battle in his favor when, at evening of September 14, 1862, he fell mortally wounded. W. F. J.

RENOUF, Émile, a French painter; born in Paris,

June 23, 1845. He was a pupil of Carolus Duran and Lefebvre; exhibited first at the Salon in 1872; devoted himself to *genre*, landscape and marine pictures, and was fortunate in portraying his subjects with much truth. His works include *Tourne donc, Mousse!* (1876); *Dernier Radoub*, "*Mon Pauvre Ami*" (1879); *La Neuve-île de Scin* (1880); *Un Coup de Mer* (1885); *Les Guetteurs* (1888); and *Une Partie de Cartes* (1892). He received a first-class medal at the Paris Exposition (1889), and the cross of the Legion of Honor in the same year.

RENOUF, Sir Peter le Page, Orientalist; born on the Island of Guernsey, Aug. 23, 1822. He was educated in Guernsey and at Pembroke College, Oxford; joined the Catholic Church in 1842, and in 1855 was appointed professor of ancient history and Eastern languages in the Catholic University of Ireland. From 1864 to 1885 he was an inspector of schools, and in the latter year succeeded Dr. Birch as keeper of Assyrian and Egyptian antiquities at the British Museum, retiring in 1891. He was elected president of the Society of Biblical Archæology in 1887, and was knighted in 1896. While at the college he edited two Catholic periodicals, and he was long an active writer on theological and archæological subjects. Among his productions are *The Condemnation of Pope Honorius* and *Lectures on the Origin and Growth of Religion as Illustrated by the Religion of Ancient Egypt.* He died in London, October 14, 1897. G.J.H.

RENOVO, Pennsylvania, a borough of Clinton County, on the north bank of the Susquehanna River, and on the Sunbury and Erie division of the Pennsylvania railroad, 54 miles west of Williamsport. It is the commercial and manufacturing center of a farming, mining, and lumbering region, with attractive mountain scenery, which makes Renovo also a frequented summer resort; railway work-shops, tanneries, brick and other works, supply an active trade. Population, 1891, 4,154; 1900, 4,082. C.L.S.

RENSSELAER, Indiana, the seat of Jasper County, a city on the Iroquois River, and on the Chicago, Indianapolis and Louisville railroad, 72 miles southeast of Chicago, Ill. It exports live stock and agricultural produce, and manufactures paint, crushed rock, woodwork, etc. The St. Joseph Normal Indian School, a Roman Catholic institution, is situated here. Population, 1890, 1,455; 1900, 2,255. C.L.S.

RENSSELAER POLYTECHNICAL INSTISTUTE, a school founded in Troy, New York, in 1824, by Stephen Van Rensselaer for the teaching of theoretical and practical science. It was reorganized in 1849 on the basis of a general polytechnic institute. There are three buildings given up to lectures, museums and laboratories and a large gymnasium. The course in civil-engineering has been supplemented since 1885 by a course in general science. There are 21 instructors, some 240 students and the library contains over 5,000 volumes. The school is non-sectarian, and is supported by its dues and fees, the annual tuition being $200. See also Technical Schools, in these Supplements.

RENWICK, Edward Sabine, inventor, son of James Renwick, was born in New York on January 3, 1823, became an engineer, repaired the steamship *Great Eastern* without docking her, and made many inventions. W.F.J.

RENWICK, Henry Brevoort, engineer, son of James Renwick, was born in New York on September 4, 1817, was graduated from Columbia College in 1833 and was employed by the U. S. government as an engineer. He died on January 27, 1895. W.F.J.

RENWICK, James, scientist, educator and author, was born in England on May 30, 1790, of Scotch descent, and was brought to New York in 1794. He was graduated from Columbia College in 1807, spent several years travelling in Europe with his friend Washington Irving, and then became an engineer in the U. S. army and, beginning in 1820, professor of natural philosophy and chemistry in Columbia College, in which latter place he spent the rest of his life, becoming professor emeritus in 1853. He planned the Morris canal, across New Jersey, and patented the use of inclined planes instead of locks. He was a fine linguist and classical scholar, an accomplished astronomer, and an artist in water colors. He was the author of many scientific and biographical volumes. He died in New York on January 12, 1862. W.F.J.

RENWICK, James, Jr., architect, son of James Renwick, was born in New York on November 3, 1818, was graduated from Columbia College in 1836, became an engineer and built the reservoir at Fifth Ave. and Forty-second St., where the New York Public Library now stands. He then became an architect, and built Grace Church, on Broadway, and the St. Patrick's Cathedral, on Fifth Ave., New York; the Smithsonian Institution, Washington, and many other notable edifices. He died in New York on June 23, 1895. W.F.J.

REORGANIZED CHURCH OF LATTER-DAY SAINTS. See Latter-day Saints, in these Supplements.

REPHAIM. See Bashan, Vol. III, pp. 353, 354.

REPLENISHER. See Electrometer, Vol. VIII, p. 114.

REPOUSSÉ. See Metal-work, Vol. XVI, pp. 78–81; Plate, Vol. XIX, p. 189.

REPRESENTATIVE GOVERNMENT. See Government, Vol. XI, pp. 12–14.

REPRODUCTION, Animal. See Embryology, in these Supplements.

REPRODUCTION, in plants, from the standpoint of morphology, has already been considered under Morphology, in these Supplements. It only remains to consider it from the physiological standpoint. The fundamental fact of reproduction is the separation from the parent body of a mass of protoplasm which is capable of developing a new organism. Several kinds of reproduction are recog nized, but all are reducible to the above statement. As with all other plant-functions, a certain power of reproduction is retained by all cells not highly specialized, certainly by all cells of primitive struc

ture. Owing to this fact, reproduction by "vegetative multiplication" is common; that is, certain portions of the vegetative body, under suitable conditions, can develop a complete organism. The simplest form of vegetative multiplication is seen in those one-celled plants which multiply by cell-division. In the case of multicellular plants, this process would result simply in the growth of the body; but in these plants vegetative multiplication is secured by the separation of certain portions of the body, as the dying away of a main axis and the isolation of branches, each of which can reproduce the complete organism, the formation of buds of various kinds, tubers, etc. The power of vegetative multiplication is evident even in the highest plants, which can be propagated by grafts, cuttings, etc., in some cases even every smallest fragment of the parent body being able to produce a complete organism. The power of vegetative multiplication, while generally diffused, often becomes specialized in distinct organs, such as the "gemmæ" of certain liverworts and other groups. As the transition from general to specialized vegetative multiplication is gradual, so is the transition from the specialized organs for vegetative multiplication to the specialized cells known as "spores."

As distinguished from reproduction by vegetative multiplication, the other phase of reproduction is that by spores. A spore is a single cell specialized for reproduction, and represents the highest degree of differentiation of the reproductive power. Two kinds of spores are recognized, differing from each other, not in their power of reproduction, but in their origin. One, the *asexual spore*, is formed by the ordinary processes of cell-division; the other, the *sexual spore*, is formed by the union of two sexual cells, known as *gametes*. Asexual spores are produced by almost all plants, while sexual spores are wanting among the lowest plants, and also among certain high plants (such as the higher fungi) in which sexuality has been lost through degeneracy. Asexual spores are developed either within a special cell, the sporangium, or by the abstriction of certain specialized branches. It is a notable fact that when sexual spores appear, both they and the asexual spores continue, among Thallophytes, to be produced by the same plant body. Among those higher Thallophytes in which alternation of generations becomes apparent, and a sporophyte is developed which produces asexual spores, the gametophyte still retains its power of producing asexual as well as sexual spores. In such cases three sets of spores appear in the life-history of the plant; viz., the sexual spores of the gametophyte, and the asexual spores of the gametophyte and sporophyte. These two kinds of asexual spores differ from each other in this regard: that the gametophyte spore reproduces its parent plant, the gametophyte; while the sporophyte spore produces, not another sporophyte, but the antithetic generation, the gametophyte. This difference becomes a striking resemblance, however, by stating that asexual spores always produce gametophytes, and sexual spores produce only sporophytes. In groups higher than the Thallophytes (Bryophytes, Pteridophytes and Spermaphytes), in which alternation of generations becomes very distinct, the gametophyte has lost its power of producing asexual spores, which are confined strictly to the sporophyte.

In the case of sexual reproduction, the preparation of the spore is more complex. Two sexual cells, the gametes, are developed, having originally been derived from motile asexual spores (zoöspores), and by their fusion (called *conjugation* if the gametes are similar, and *fertilization* if they are dissimilar) form the spore (*zygospore* or *oöspore*). The gradual transition from zoöspores to gametes, and the differentiation of similar gametes into very dissimilar ones (*oöspheres* and *spermatozoids*), have been discussed under MORPHOLOGY, in these Supplements. The process of fertilization is as follows: The male gamete, by its own activity, or more passively conducted, is brought into the neighborhood of the female gamete. In case the male gamete is a spermatozoid (free-swimming), as in Algæ, Bryophytes and Pteridophytes, the act of fertilization is connected with aquatic conditions, and the free-swimming gamete is observed to be attracted to the oösphere by a certain substance secreted by the female organ, and diffused through the water. In mosses this substance is found to be cane sugar; in ferns, a salt of malic acid. In heterosporous plants the approach is usually different, the aquatic conditions being absent, and the male gamete not being developed into a spermatozoid. In such cases the gamete is conducted to the oösphere through a specially developed tube. Another preparatory process which should be noted is "the reduction of chromosomes." The nucleus of all cells is found to consist partly of a denser substance, which assumes the form of a delicate thread or filament. As this substance stains readily, it has been called *chromatin*. The chromatin filament, in the resting stage of the nucleus, appears as a continuous coiled thread. In cell-division, however, the thread breaks up into a definite number of parts, called *chromosomes*. The number of chromosomes is constant in each kind of plant; if it be eight, that number appears in every cell, the process of cell-division carefully dividing each chromosome of the parent nucleus. By the union of gametes, however, the number of chromosomes in the resulting spore is doubled, and this doubled number appears in all the cells of the sporophyte derived from the oöspore. It is evident that this would lead eventually to an indefinite multiplication of chromosomes. The provision against this result is the process of "reduction of chromosomes." This has been observed carefully in the higher plants, in which there is distinct alternation of generations, and is as follows: In the case of a sporophyte whose nuclei contain sixteen chromosomes, in the division of the mother-cells for the purpose of producing the asexual spores the reduction of chromosomes by one half occurs, so that the nuclei of the asexual spores contain but half the number of chromosomes possessed by all the cells of the sporophyte,—that is, 8 instead of 16. This sudden reduction is described as due to the fusion of

chromosomes in pairs. As the asexual spore, with its eight chromosomes, produces the gametophyte, the number eight will appear in all the cells of the gametophyte, among which are the gametes. The two gametes, therefore, approach each other with the reduced number of chromosomes, and by their coalescence produce a cell, the oöspore, in which the number of chromosomes is restored to 16. The oöspore developing the sporophyte, the number 16 appears in all the cells of the sporophyte, to be reduced suddenly again upon the formation of the asexual spores.

The two gametes, having been brought into contact as described above, begin to fuse part with part, cytoplasm with cytoplasm, centrosphere with centrosphere, and nucleus with nucleus, the chromosomes of the two gametes, however, remaining distinct. The chromosomes do not fuse throughout the whole history of the sporophyte, which results from the oöspore, until with the formation of the asexual spores they suddenly fuse, and the reduced number appears. The first evident result of fertilization is the formation of a cell-wall about the fused product, thus completing the structure of the oöspore. Two series of results follow: 1. The formation of the embryo from the oöspore by cell-division; and 2. Changes, more or less extensive, in neighboring structures not directly concerned in the act of fertilization. These changes result in the formation of the structure known as "the fruit," which thus has a physiological rather than a morphological significance.

The chromosomes are supposed to be the material carriers of hereditary characters, and are observed to be an aggregation of very minute disks that have been called *ids*. In the case of sexual reproduction, two sets of chromosomes, with their numerous ids, carrying two sets of hereditary characters derived from long lines of ancestors, unite, making a combination which, in the very nature of things, cannot often be duplicated. Consequently, sexual reproduction is looked upon as a prolific source of variation.

Probably the most difficult problem of heredity connected with plants is to be found in the fact of alternation of generations, in which spores do not reproduce the parent form, but a very dissimilar structure. A suggested explanation is that this phenomenon may be accounted for by the fact that in fertilization the two sets of chromosomes do not fuse, the result being a structure (the sporophyte) unlike the parent form; but when they do fuse in the production of asexual spores, these spores reproduce the original form (the gametophyte).

Connected with the subject of reproduction is that of sexual affinity. Gametes which enter into sexual union are produced usually by the same species, but the possibility of the union of gametes of different specific origin is witnessed by the production of hybrids,—a phenomenon very common among plants. The possible range of hybridization has not been determined, but it varies widely in different groups of plants, some hybridizing extensively, others apparently not at all. In the groups which hybridize, species of the same genus cross freely, and sometimes species of different genera, but whether a wider range of crossing is possible remains to be discovered.

JOHN M. COULTER.

REPÚBLICA MAYOR DE CENTRO AMERICA, the title under which the three American republics of Honduras, Nicaragua and San Salvador formed a confederation by the treaty of Amalpa, ratified in 1896. See HONDURAS, NICARAGUA and SAN SALVADOR, in these Supplements.

REPUBLICAN PARTY. The Republican party, at the time of its origin, 1854, was an amalgamation of little parties and factions, which, in the course of twenty years, had been split from the Whigs and Democrats by the various phases of the slavery question. One element was the Free-Soil party, which furnished such leaders as Julian, John P. Hale, Charles Sumner, Wilmot, Francis P. Blair and Charles Francis Adams. Another was that faction of the Whigs which refused to accept the Fugitive Slave Law or indorse the Compromise of 1850, and was represented by Abraham Lincoln, William H. Seward, Horace Greeley, Henry Wilson, Thaddeus Stevens, John Sherman, William L. Dayton and William Pitt Fessenden. A third part was contributed by the Know-Nothings, led by Nathaniel P. Banks, Schuyler Colfax and Henry Winter Davis. A fourth part came from the Democrats, under Hannibal Hamlin of Maine, Simon Cameron of Pennsylvania, Gideon Wells of Connecticut, William Cullen Bryant and Montgomery Blair. Finally, there was a contingent of War Democrats, who joined it after secession began, and, in many instances, drifted away in the days of reconstruction. Such men were Andrew Johnson, John A. Dix, John A. Logan, John Cochrane, Daniel E. Sickles, Benjamin F. Butler and Edwin M. Stanton.

The political factions these men led had little in common, save a strong determination not to see the territories, and especially those north of the "thirty-six-thirty" line, opened to slavery. When, therefore, the Kansas-Nebraska Bill was before Congress in 1854, forgetting all differences, and remembering only the common cause, they united, and, under the name of "Anti-Nebraska men," fought for the freedom of the territories. But what took place in Congress had already taken place all over the North. Everywhere, in 1854, Whigs and Free-Soilers and Democrats were holding conferences and state conventions and forming "fusion tickets," and naming the new party. Just when the name *Republican* was applied cannot be determined. It was used at a conference at Ripon (Wisconsin) in March, and at a conference of Anti-Nebraska Congressmen in May, and by state conventions in Michigan, Maine, Ohio, Indiana, Illinois and Iowa. Success attended the party from the start, and at the elections of 1854 it carried 15 out of 31 states, secured 11 Senators and a plurality of the House of Representatives. This was so encouraging that in December, 1855, the state committees of Maine, Vermont, Massachusetts, New York, Pennsylvania, Ohio, Michigan, Indiana and Wisconsin issued a call for a convention at Pittsburg, Feb. 22, 1856, where the national organization of the party was completed. A national com-

mittee was elected and a nominating convention summoned to meet at Philadelphia, June 17, 1856.

The platform then adopted declared against the repeal of the Missouri Compromise, against the extension of slavery into the free territories, and called for the admission of Kansas as a free state, and for a railroad to the Pacific. The candidates were John C. Frémont, a Free-Soiler, and William L. Dayton, an Old Whig, and with the rallying cry, "Free soil, free speech, free men, Frémont," the party entered the campaign, and was defeated, but elected 92 out of 237 Congressmen. The Dred Scott decision, the Lecompton Bill, and the breaking up of the Know-Nothings in the course of the next two years, added thousands to its membership, and in 1860 its candidates, Abraham Lincoln and Hannibal Hamlin, were elected. The Republicans then stood for a homestead law, a protective tariff, a river and harbor bill, a railroad to the Pacific, and all the other principles they declared for in 1856. The events of the war threatened for a time to split the party, and in 1864 the radical element went so far as to hold a convention at Cleveland and nominate Frémont and General John Cochrane of New York, the popular Irish leader. But taking, temporarily, the name of National Union Party, the Republicans nominated Lincoln and Andrew Johnson, a War Democrat, and in their platform indorsed the prosecution of the war for the Union, the emancipation proclamation, the Thirteenth Amendment, the redemption of the debt, and the enforcement of the Monroe doctrine in Mexico. The death of Lincoln, following hard upon his inauguration, put Johnson in the chair, and the long quarrel over reconstruction began. The Civil Rights Bill, the Freedmen's Bureau Bill, the Fourteenth Amendment, the Reconstruction Bill, and the Tenure of Office Act were passed, many of them over the veto, and Johnson was impeached, tried, and not found guilty.

In 1868, U. S. Grant and Schuyler Colfax were nominated and elected, and on their appearance a new era began in the party history. Most of the old leaders, Lincoln, Seward, Chase, and Wells, were gone; a new generation, represented by Blaine, Conkling, Sherman, Edmunds, and a host of others, was in control, and to it fell the task of dealing with the evils which sprang from reconstruction and the enfranchisement of the negro. This the party did by coercive legislation and vigorous executive action. The legislation comprises the Fifteenth Amendment, the "Kuklux Act" (April 20, 1871), or so-called "Force Bill." The executive measures were the proclamations of Grant, under the "Kuklux Act," suspending the writ of *habeas corpus* in certain counties of South Carolina.

The result of this legislation, and of the scandals (such as the Crédit Mobilier, the whisky frauds and the Louisiana outrages), was the Republican "bolt" (1870–72), and the formation of the Liberal Republican party, demanding general amnesty to rebels, civil service reform, local self-government for the states lately in rebellion, no more land grants to corporations, and a return to specie payments. Though the loss of this wing was serious, the party was not crippled, and in 1872 re-elected Grant over Greeley (the candidate of the combined Democratic and Liberal Republican parties) by an immense majority.

With the second inauguration of Grant the war issues began rapidly to disappear and financial questions to take their place. The Democrats demanded more paper, and the payment of the debt in paper money. The Republicans demanded a speedy return to specie payment, and as a first step toward this had begun to contract the legal-tender currency in Johnson's adminsitration. But the West cried out so vigorously that it was stopped, and not till Jan. 14, 1875, was an act passed providing for a resumption of specie payments on a certain day. The day chosen was Jan. 1, 1879. Meantime silver had been demonetized (Feb. 12, 1873), and as this made gold the only coin in which bonds could be paid, the idea spread that it was a scheme to give bondholders more than they deserved, as many had paid for their bonds in paper. In 1878, therefore, Congress passed the Bland Silver Bill, which Hayes vetoed, and which Congress, by great majorities (Feb. 28, 1878), passed over the veto.

Hayes and Wheeler were nominated at Cincinnati in June, 1876, and after a close contest at the polls were declared duly elected by the Electoral Commission (March, 1877). In 1880 a desperate effort was made by three Republican "bosses," Logan, Conkling and Cameron, to nominate Grant for a third term. This caused a convention of anti-third-term Republicans to be held at St. Louis, where resolutions condemning the idea were passed. But the idea would not down, and in the national convention at Chicago the vote for Grant was never less than 302, and twice rose to 312. The vote for Blaine was equally solid. The result was the union of all anti-third-term men on James A. Garfield and Chester A. Arthur.

The issues in 1880 were tariff, civil service, polygamy and restriction of Chinese immigration. The assassination of Garfield by Guiteau (July 3, 1881) put Arthur in the chair. The memorable acts of his term of office were the reduction of the postage, the tariff of 1883, the Civil Service Reform Act, the American Shipping Act, the law increasing pensions, suspension of Chinese immigration for ten years, and the retirement of the trade dollar.

The nomination, in 1884, of James G. Blaine and John A. Logan was followed immediately by the revolt of such Republicans as opposed the political principles and methods for which Blaine stood, by the formation of the Independent, or "Mugwump," party and by the election of Grover Cleveland.

For the first time in 24 years the Republican party lost the Presidency, and, though it was regained in 1888 by the election of Benjamin Harrison and Levi P. Morton, it was lost again in 1892 by the re-election of Grover Cleveland. The memorable acts of Harrison's term are the McKinley tariff, the Silver Bill, the Original Package Law, the Immigration Law, that providing for international copyright, and the Chinese Exclusion Law. In 1892 Harrison and Whitelaw Reid were the candidates, nominated by a convention at Minneapolis, June 7th. The platform called for protection, bimetallism, admission of

the territories, the cession of arid lands to the states and anti-trust legislation.

Though defeated at this election, the party was successful at the next Congressional election in the autumn of 1894, and regained the House by a great majority. In June, 1896, William McKinley and G. A. Hobart of New Jersey were nominated for the Presidency and Vice-Presidency at St. Louis, on a platform declaring for the gold standard, a protective tariff, the Monroe doctrine, reciprocity treaties, restricted immigration and Cuban independence. On the 3d of November they were chosen by the popular vote for electors, having carried, among others, every state from Iowa to the Atlantic north of the Ohio and Potomac rivers. J. B. McMaster.

The platform of the party in the Presidential election of 1900, as formulated at the National convention held at Philadelphia, June 20 (1900), calls for the maintenance of a protective tariff and a law making gold the standard of value. The nominations were William McKinley for President and Governor Theodore Roosevelt for Vice-President. The renomination of Mr. McKinley fulfilled universal expectation within the party, while the choice of Mr. Roosevelt was deemed a happy as well as a strong one. The administrative policy of the McKinley administration with regard to the territorial possessions won from Spain was deemed just and wise and was heartily endorsed. On the question of trusts, the platform affirms that the party recognize the necessity and propriety of the honest coöperation of capital to meet new business conditions and especially to extend the nation's rapidly increasing foreign trade, but it condemns all conspiracies and combinations intended to restrict business, to create monopolies, to limit production, to control prices. The other planks adopted were those touching the Isthmian canal, the Philippine problem, the attitude of the government with regard to Britain's war with the South African republics, and its attitude on the subject of Cuban independence. The issues of the Nov. elections gave Mr. McKinley an electoral vote of 292 and Mr. Bryan 155. The Republican Nat. Convention held in 1904, nominated Theodore Roosevelt for Pres., and Chas. W. Fairbanks for Vice-Pres. The Nov. election gave the Republicans 336 electors and the Democrats, 140.

REQUISITION, the act of demanding that an act be done which the person making the requisition has a right to demand. A requisition of title is a written inquiry made by one contemplating the purchase of land, or his solicitor, and directed to the owner thereof, in regard to some apparent insufficiency in the title. The most familiar use of the term is the demand of the governor of one state made upon the governor of another state for the return of a fugitive from justice under the provisions of the United States constitution, which provisions generally are supplemented by state laws enacted in harmony therewith. See also Extradition, in these Supplements.

RESACA, a village of Gordon County, Georgia. It was here that on May 14 and 15, 1864, Sherman fought one of the first battles of his celebrated Georgia campaign. Knowing that General Johnston was marching toward Resaca, Sherman dispatched McPherson to cut off his supplies by the railroad, and also to prevent Johnston from gaining this desirable position. McPherson, however, was unsuccessful. As soon as Sherman heard of this failure he himself marched on to Resaca, and on the 14th skirmishing and artillery fire continued all day. On the following day, McPherson gained an elevated position which enabled him to destroy the railroad bridge over the Oostenaula River. Johnston tried in vain to dislodge him, but, finding himself unable to do so, and being close pressed by Sherman and Hooker, retreated on the night of the 15th.

RESACA DE LA PALMA, Texas, in Cameron County, a few miles north of Brownsville, on the Rio Grande del Norte, at the Mexican border, is celebrated as the scene, May 9, 1846, of the victory of 2,000 American soldiers, under Gen. Z. Taylor, over 6,000 Mexicans. C.L.S.

RESCISSION, a term in use in respect to contracts, and means an annulment or refusal to perform the contract. See also Deceit; False Pretenses; Ignorantia Facti; and Ignorantia Juris, in these Supplements.

RESERVATION SYSTEM. See Indian Affairs, in these Supplements.

RESERVOIR DAMS. See Water-supply, Vol. XXIV, p. 427.

RES GESTÆ, the subject-matter of a transaction, and includes the facts which surround the transaction so as to be a part thereof. The term is used chiefly in connection with a rule of evidence to the effect that evidence of statements, conversations or acts can be received only when such statements, conversations or acts are a part or the *res gestæ* of the controversy.

RESHD. See Rasht, Vol. XX, p. 298.

RESHID PASHA, a Turkish prime minister (1802–58). See Turkey, Vol. XXIII, p. 692.

RESILIENCE. See Elasticity, Vol. VII, p. 700.

RESISTANCE. See Electricity, §§ 43, 45, 46, in these Supplements.

RESONANCE, Electrical. See Electricity, § 91, in these Supplements.

RESPIRATION, in botany, is applied to that phase of destructive metabolism (catabolism) which involves a gaseous interchange between the plant and the air, the plant absorbing oxygen and giving off carbonic dioxide.

RESPIRATORY SYSTEM. See Respiration, Vol. XX, pp. 488–500.

RESPONDENTIA BOND. See Bottomry, Vol. IV, p. 153.

RESTIGOUCHE, a river. See New Brunswick, Vol. XVII, p. 382.

RESURRECTION. See Eschatology, Vol. VIII, pp. 472–476; Gospels, Vol. X, pp. 716, 721, 476, 477.

RESURRECTION-PLANT, a popular name given to certain species of *Selaginella*, one of the genera of club mosses (*Lycopodinæ*), which exhibit

strong hygroscopic properties. The most common species is *S. lepidophylla*, from Lower California and Mexico. It is a nest-like ball when dry, hence often called bird's-nest moss, but when moist unfolds and displays its dense, fern-like branches.

RESUSCITATION OR ARTIFICIAL RESPIRATION. See DROWNING, Vol. VII, pp. 410–411.

RESZKE, EDOUARD and JEAN DE. See DE RESZKE, in these Supplements.

RETENE, a hydrocarbon ($C^{18}H^{18}$) found in some bitumens and in fossil pine stems. It is produced in the distillation of wood and on passing acetylene through a red-hot tube. It forms white flakes, soluble in alcohol, ether and carbon-disulphide; melts at 98°5 and boils at 390°.

RETENTION OF URINE. See VESICAL DISEASES, Vol. XXIV, p. 207.

RETICULARIA. See PROTOZOA, Vol. XIX, pp. 867–868.

RETINA. See EYE, Vol. VIII, pp. 714–720.

RETRIEVER. As the name implies, the retriever is a breed of dog trained to find out and bring back any killed or wounded game. The work of the retriever was long done by various breeds of dogs, such as the pointer, setter or spaniel, but, in addition to its spoiling these dogs for their regular work, they were found to be too hard-mouthed,—the worst fault possible in a retriever, as he wastes more in game injured than would have been lost without him. Crosses with the Newfoundland were tried, and gradually two kinds of retriever were introduced. One variety, known as wavy-coated, was probably the result of a cross with the setter; and the other, known as curly-coated, is from the water-spaniel or poodle. Not much attention was paid to the retriever until the introduction of dog-shows, about 1850, but since that time the breed has been kept free from any fresh cross, with a great improvement in the appearance. The two varieties of retriever differ only in coat; the curly coat should curl closely and firmly all over the body, the wavy coat should fall straight and thick. An intelligent large head, with a full clear eye, should always be seen in the retriever. Legs and feet need to be large and strong. The retriever should not be too small, as it needs a powerful dog to retrieve a hare successfully. The retriever makes a very good watch-dog, and numberless bad specimens of the breed are to be found fulfilling this vocation only. The pure retriever is gentle in temper and easy to command.

RETTING. See FLAX, Vol. IX, pp. 257–258.

REUSS, a river. See SWITZERLAND, Vol. XXII, p. 815.

REUSS, EDUARD WILHELM EUGEN, a Protestant theologian; born at Strasburg, July 18, 1804; studied at Strasburg, Göttingen, Halle and Paris. He was from 1834–88 professor of Biblical and Oriental sciences at the University of Strasburg, where he died April 15, 1891. Among his works are *Geschichte der Heiligen Schriften des Neuen Testaments* (1842); *Histoire de la Théologie Crétienne an Siècle Apostolique* (1852); *L'épitre aux Hébreux* (1861); *Bibliotheca Novi Testamenti Græci* (1872); *Geschichte der Heiligen Schriften des Alten Testaments* (1881); *Das Buch Hiob* (1888); and a French translation of the Old Testament with commentaries.

G.A.S.

REUTER, PAUL JULIUS, BARON VON, founder of the Reuter Telegram Company at London; born at Cassel, July 21, 1821. In 1849 he established the first news agency with headquarters at Aachen, which were removed to Verviers, then to Quiêvrain, and in 1851 to London. In 1858 he succeeded in interesting the English press, to adopt his dispatch services, when he established branch offices at the business centers of the entire world. In 1865 he was granted the privilege by King George of Hanover to lay a submarine cable between Norderney and England, and in 1869 he received the concession from the French Government to connect France and the United States by a cable. In 1871 he was ennobled by the Duke of Saxe-Coburg-Gotha. He died at Nizza, Feb. 25, 1899. The present manager of the Reuter Telegram Company, which furnishes the latest political, commercial and financial news is BARON HERBERT VON REUTER, oldest son of Paul Julius. G.A.S.

REVELATION. See APOLOGETICS, Vol. II, pp. 167–169; INSPIRATION, Vol. XIII, pp. 161–163; and PROPHET, Vol. XIX, pp. 842–845.

REVENUE. See FINANCE, Vol. IX, pp. 153–167.

REVERE, PAUL, engraver and patriot, was born in Boston, of French Huguenot descent, on January 1, 1735. He was trained as a goldsmith, and became an expert engraver on silver plate. He also became a copperplate engraver, and produced many portraits of distinguished men, and also the plates for the printing of Massachusetts paper money in 1775. In the latter year he was commissioned by Congress to learn the art of making gunpowder, and established a mill for that purpose — the only one the patriots had at that time. The night before the battle of Lexington, on receiving a signal from a friend in Boston, he rode on horseback from Charlestown to Lexington, warning the people of the coming of the British troops. This incident has been finely described by Longfellow in one of his best ballads. Revere was also one of those who threw overboard the tea in Boston harbor. He served for a time in the Revolutionary army, and after the war established at Canton, near Boston, a foundry for the manufacture of church bells. He died in Boston in May, 1818. W.F.J.

REVERSION OR ATAVISM. See BREEDS AND BREEDING, Vol. IV, p. 221.

REVERISON, in law. See REMAINDER, Vol. XX, pp. 384–385.

RÉVILLE, ALBERT, theologian; was born at Dieppe, France, on November 4, 1826, and became a minister and theological instructor of the Protestant Church. In 1849 he was settled as pastor of the Walloon Church at Rotterdam; from 1851 to 1872 he lectured on theology at the

University of Leyden, and in 1880 became professor of the history of religions in the College of France. His published works include a *Manual of Religious Instruction* (1863); *The Divinity of Jesus Christ* (1869); *Prolegomena of the History of Religions* (1881); *Native Religions of Mexico and Peru* (1883); *Religions of Uncivilized Peoples* (1883); *The Chinese Religion* (1889); a *Comparative History of Philosophy and Religion*, and other treatises on *Satan*, on *Redemption*, and on *Apollonius of Tyana*. His writings have had a wide circulation as authoritative expressions of the most advanced religious thought in the French Protestant churches. W.F.J.

REVISION OF THE BIBLE, changes made necessary by change of language and advance of knowledge. The body appointed in 1870 was divided into two parts, one of which worked on the New and the other on the Old Testament. They met once a month in London, and co-operated with a like body in America, which met once a month in New York. The whole body consisted of 79 members, 52 in England and 27 in the United States. The revised New Testament was published in 1881, and the revised Old Testament in 1885. See also ENGLISH BIBLE, Vol. VIII, pp. 348–349.

REVOLUTIONARY SOCIETIES. See COLONIAL SOCIETIES, and GENEALOGIES, AMERICAN, in these Supplements.

REVOLUTIONARY WAR, AMERICAN. See UNITED STATES, Vol. XXIII, pp. 784–786.

REVOLVER, a firearm similar to the pistol, but having a chambered cylinder between the barrel and the breech-mechanism, each chamber carrying a cartridge, so that it can be fired, without reloading, as many times as there are chambers. Each motion of the trigger brings a chamber into line with the barrel, so that its cartridge may be discharged at the next pull on the trigger. Numerous patents for this principle have been taken out, an American by the name of Elisha H. Collier patenting such a weapon in the United States and England about 1818. In 1835 Colonel Samuel Colt patented his famous revolver. The most recent improvement is known as the hammerless revolver, because it has a concealed hammer that cannot be caught by accident, causing the unintentional discharge of the piece. The trigger cannot be pulled unless at the same time a pressure is applied to a safety-latch which releases the internal hammer. The object of the arrangement is to render the revolver absolutely secure against accidental discharge in the pocket. See also GUNMAKING, Vol. XI, p. 253; COLT, SAMUEL, Vol. VI, p. 149; and *Revolvers and Pistols*, under GUNMAKING, in these Supplements.

REWARD, a sum of money or other thing of value in the nature of a premium paid to a person for the performance of some special or extraordinary service. A reward may be offered by the government, or by a private person. If offered by the government it is a premium usually consisting of a sum of money to be paid by authority of law for the performance of some act for the public good. If by a private person, it is for the performance of some special service of value, chiefly to the person making the offer. A reward is governed in character by the nature of the service desired, rather than by the amount of labor or skill required in performing it, and differs widely from ordinary payment or compensation. It is usually governed by the desirability of accomplishing the purpose, and the amount of work involved has little to do with fixing the amount of a reward. Rewards are usually offered to the public in general, in the hope that some one may be found who, through accident or good fortune, may be able to perform the service. They are frequently offered by the government in the case of escaped criminals, but usually only upon the condition that the accused when taken shall be finally convicted. The publication of an offer of reward is a general offer, and the person who accepts it by doing the act desired is entitled to the reward and can sue for its recovery. Rewards are frequently offered by private persons for the return of lost property, and if the finder acts upon the knowledge that a reward has been offered he is entitled to claim it. One who is entitled to receive a reward upon the conviction of a criminal may still be a competent witness against the accused, in the absence of a statute to the contrary.

REYER, ERNEST, a French musical composer, whose real name was Rey; born in Marseilles, Dec. 1, 1823. At the age of 16 he went to Algiers as a government official, and continued his pianoforte practice and began to compose. His compositions became popular, and in 1848, when the Revolution deprived him of his situation, he returned to Paris and completed his musical education under his aunt, Madame Louise Farrenc. He composed the music for several successful operas, among them being *Le Selam; Maître Wolfram; Sacountala;* and *Victoire*. M. Reyer wrote for the *Presse*, the *Revue de Paris* and *Courrier de Paris*; and after the death of Berlioz, he became musical critic to the *Journal des Débats*.

REYKJAVIK. See ICELAND, Vol. XII, p. 654.

REYNARD THE FOX. See FABLE, Vol. VIII, p. 734.

REYNOLDS, SIR J. RUSSELL, an English physician; born in Romsey in 1828. He was educated at University College, London, and the University of London; was elected fellow of University College in 1856, of the Royal College of Physicians in 1859, and of the Royal Society in 1869; was appointed professor of principles and practice of medicine in University College in 1865; member of the council in 1888; was *emeritus* professor of medicine in University College, and consulting-physician to University College Hospital, and from 1878 until his death physician in ordinary to the Queen's household. He wrote *Essay on Vertigo* (1854); *Diagnosis of Diseases of the Brain, Spinal Cord and Nerves; Facts and Laws of Life* (1859); and *Lectures on the Clinical Uses of Electricity* (1871); besides numerous magazine articles and lectures; he was made a baronet in 1895; was president of the Royal

College of Physicians, and in 1895 president of the British Medical Association. He died May 29, 1896.

REYNOLDS, John Fulton, soldier, was born at Lancaster, Penn., on September 20, 1820, and was graduated from West Point in 1841, being assigned to the artillery corps. In the Mexican War he served under General Taylor, and won promotion at Monterey and Buena Vista. He served in Oregon and Utah, and in 1860–61 was commandant at West Point. In the Civil War he commanded Pennsylvania volunteers in the Peninsular campaign until the battle of Glendale, on June 30, 1862, when he was captured. Six weeks later he was released by exchange, and then served at the second battle of Bull Run, where only his personal gallantry kept the defeat from becoming a rout. He commanded the Pennsylvania militia when Lee invaded that state. He was held in reserve at Chancellorsville, though he asked to be sent to the front. On July 1, 1863, he hastened with his corps to Gettysburg to head off Lee, selected the position upon which the Federal army won its victory, and was killed at the head of his troops at the beginning of the battle. W.F.J.

GEN. J. F. REYNOLDS.

REZONVILLE, Battle of. See Gravelotte, in these Supplements.

RHACHITIS, the technical name for Rickets, Vol. XX, pp. 562–563.

RHÆTO-ROMANIC DIALECTS, same as Ladino. See Romance Languages, Vol. XX, p. 686.

RHAMPHASTIDÆ or RAMPHESTES. See Toucan, Vol. XXIII, pp. 506–507.

RHAPSODISTS. See Greece, XI, 122, 123.

RHATANY, the name of a drug obtained from the root of certain South American species of *Krameria*, an anomalous genus sometimes placed in the family *Polygalaceæ*, sometimes in the family *Leguminosæ*, and sometimes made to constitute a family of its own, the *Krameriaceæ*. The medicinal principle is a tannin; useful as an astringent.

RHEA. See Cybele, Vol. VI, p. 657.

RHEA, the stage name of Hortense Barbe Loret, a Belgian actress; born in Brussels in 1845. Early in life she made the acquaintance of Charles Fechter, who placed her in the care of Samson, the famous instructor of Rachel. Through his influence she was permitted to study under Beauvollet in the Paris Conservatoire. For ten years she attained success in France, and in 1881 visited the United States, playing first in Boston. Her chief success was in tragedy, in *Adrienne Lecouvreur*. Died in Montmorency, France, about May 8, 1899.

RHEA SILVIA. See Romulus, Vol. XX, p. 840.

RHEINBERGER, Joseph, a German musician; born at Vaduz, in Liechtenstein, March 17, 1839; studied at the Conservatory of Munich, at which institution he, from 1855–1901, taught piano, counterpoint, and composition. In 1855 he was appointed court kapellmeister. He died at Munich, Nov. 25, 1901. Among his compositions are pieces for the piano, organ, stringed instruments, songs, ballads, choruses; the symphonic poem *Wallenstein;* the *Florentinische Sinfonie;* a requiem; a mass for two choruses; the operas Türmer's *Töchterlein*, *Die Sieben Raben; Die Legende Christophorus; Die Rheinsage Montfort*, and the oratorio *Der Stern von Bethlehem*. G.A.S.

RHENISH WINES or RHINE WINES. See Wine, Vol. XXIV, pp. 635–643.

RHETT, Robert Barnwell, statesman, was born at Beaufort, S. C., on December 24, 1800. His real name was Smith, but he changed it in 1837 to Rhett, in memory of a Revolutionary ancestor. He entered the South Carolina legislature in 1826, and became a leader of the "Nullification" party. In 1832 he was attorney-general of the state, and in 1837–49 was a representative in Congress, where he was the first southerner to propose or suggest dissolution of the Union. He entered the U. S. Senate in 1851, and urged the immediate secession of South Carolina, but when the state declined to adopt his suggestion he resigned his senatorship in disgust and retired to private life, in 1852. He was a prominent member of the Confederate Congress, was a delegate to the Democratic National Convention of 1868, and died on Sept. 14, 1876. W.F.J.

RHEUM. See Rhubarb, Vol. XX, p. 544.

RHIND, J. Massey, a Scotch sculptor; born near Edinburgh; descended from a line of famous Scotch sculptors and artists; studied under Delau in Paris. He early developed great talent, receiving in one year at the South Kensington three gold medals. He removed to America in 1889, and immediately attracted attention. His designs show great originality, accuracy and taste. Among his works in the United States the principal are the bronze doors of Trinity Church, New York; the façade at the entrance of the American Surety Building, New York; the Rufus King memorial fountain, Albany; and the entrance ornamentation for Alexander Commencement Hall of Princeton University. In 1896 he completed a colossal statue of John Calhoun for the state of North Carolina.

RHINEBECK, a village of Dutchess County, southeastern New York, 16 miles above Poughkeepsie, on the Philadelphia, Reading and New England railroad, and near the Hudson River. It is a stock-raising and farming center, has a brisk trade, and manufactures wagons and carriages. It has good schools, a bank, several churches, and newspapers. Population 1890, 1,649; 1900, 1,494.

RHINELANDER, a village and the capital of Oneida County, central northern Wisconsin, 65 miles N.E. of Wausau, on the Wisconsin River, and the Chicago and Northwestern and the Minneapolis, St. Paul and Sault Ste. Marie railroads. It is surrounded by great pine forests, and manufactures lumber, wagons, staves, and has turning-works,

foundry and machine-shop. Population 1890, 2,658; 1900, 4,998.

RHINOCEROTIDÆ. See RHINOCEROS, Vol. XX, p. 535.

RHIZOCARPEÆ, the old family name of the *Hydropterideæ*, or water-ferns, a small group of aquatic Pteridophytes, comprising the genera *Salvinia, Azolla, Marsilia* and *Pilularia.*

RHIZOCEPHALA. See CRUSTACEA, Vol. VI, pp. 576–577.

RHIZOME. See BOTANY, Vol. IV, p. 87.

RHIZOPODA. See FORAMINIFERA, Vol. IX, p. 325.

RHODE ISLAND had a population of 428,556 in 1900, that of 1890 having been 345,506, the gain

STATE SEAL OF RHODE ISLAND.

constituting an increase of 24.0 per cent. The twelfth decennial census showed 10 cities within the state with a population of 8,000 or over, in which resided 347,892 of the people of the state, giving an urban population of 82.2 per cent. In 1880 there were six cities of the size mentioned, in which 175,500 persons lived, the urban population at that time being 63.46 per cent of the whole. At both dates this state had the largest percentage of urban inhabitants. The rank among the states in 1900 was that of 35, that in 1890 was 34. The density (1900) of population was 407.0 to the square mile, another item in which Rhode Island led all the states. The number of males was 210,516, the number of females 218,040; the percentage of native-born population was 68.6; the number of negroes 9,092, an increase of 1,699 since 1890; the Chinese numbered 366, the Japanese 13, and the civilized Indians 35. A census taken in 1895, by state authority, gave the population at 384,758, an increase since 1885 of 80,474, or 26.45 per cent.

The latest corrected surveys of Rhode Island give the gross area as 1,247 square miles, of which 194 square miles are water area.

In the acreage devoted to the cultivation of the cereals, Rhode Island stood last among the states and territories, with 10,552 acres, the production being 350,110 bushels. Of the total area, 61.76 per cent was under corn, 0.09 under wheat, 28.81 under oats, 2.87 under barley, 6.15 under rye and 0.32 under buckwheat. The acreage and production of the above mentioned crops for the year 1899 are given in the following table:

GRAIN.	ACRES.	BUSHELS.
Corn	8,149	288,220
Wheat	15	310
Oats	1,530	47,120
Barley	222	6,100
Rye	591	7,710
Buckwheat	45	650

The acreage under corn in 1899, according to the state census of that year, was 8,149, the production 288,220 bushels. The same authority gives the area under oats at 1,530 acres, the production 47,120 bushels. Other agricultural items of the census are as follows: Value of the horses (1900) on farms, $976,208; of the cows, $975,143; of the sheep and lambs, $41,282; of the hogs, $90,614; of the oxen and other cattle, $190,757; value of the oats crop of 1899, $16,631; of the corn crop, $164,138; of hay and forage, $1,081,482.

Manufacturing industries increased largely in Rhode Island within the decade ending with 1890, but the number of farms and the area devoted to farming was much decreased. In 1895 a state census was taken, which showed the number of abandoned farms to be, at that time, 419, with an acreage of 36,811, and of an assessed valuation of $383,250.

The latest complete statistics on manufacturing are those of the decennial census for 1900, which show Rhode Island to have had 4,189 specified manufacturing industries, which utilized $183,784,587 capital and which furnished employment to 96,528 persons, who received as annual wages the sum of $41,114,084. The estimated cost of the materials used was $96,392,720 and the value of the finished products $184,074,378. The principal line was that of cotton goods, which yielded products of the value of $26,435,675. Next in importance came worsted goods, $33,341,329; foundry and machine-shop products, $13,269,086; woolen goods, $5,330,550; and jewelry, $13,320,620. Other lines of importance were: clothing, all lines, which aggregated $1,640,734; dyeing and finishing textiles, $8,484,878; hosiery and knit goods, $2,713,850; masonry, brick and stone, $3,383,123; and slaughtering and meat-packing at wholesale, $2,410,466. The manufacture of shoddy yielded a return of $515,643, rubber goods, $2,518,268, and silverware $3,834,408.

Rhode Island stood 13 in the order of the value of fisheries in 1889, the total product amounting in value to the sum of $1,160,454. The aggregate capital invested was $1,042,072; the number of persons employed, 1,745 fishermen and 469 shoremen; the vessels numbered 110, the boats 1,320. The leading branch of the industry was the menhaden fishery, with a total value of $508,342. The inland fisheries of the state are under the control of a commission of five members appointed by the governor, and the shell fisheries are regulated by a commission of six members appointed in like manner.

At the beginning of 1899 there were six state banks in Rhode Island, whose resources and liabilities amounted to $1,983,706. At the same time there were 45 national banks doing business within the state, with a total capital stock of nearly 15 million dollars. The clearings of the national banks for 1895 amounted to $290,908,500. There were also 29 savings banks, the combined deposits amounting in 1900 to $73,489,533, belonging to 142,096 depositors, the average amount to the credit of each depositor being $502.40. The trust companies numbered eight, their cash capital amounting to $2,808,635.

In 1900 the railroad commissioner of Rhode Isl-

and reported the entire railroad mileage of the state at 683 miles. This included both steam and electric roads, of which the former had about two-thirds of the mileage. The net earnings of all lines during 1900 amounted to $7,586,145. The state has large interests invested in steamships and sailing-vessels. The tonnage of the port of Providence in 1895 was 8,456 sail, and 18,415 steam. The vessels arriving at the city from foreign ports numbered 102 during the same year. Many lines of steamships connect Providence with other ports of Rhode Island and with New York, Boston, Philadelphia, Norfolk and Baltimore.

The charitable institutions of the state include the Soldiers' Home, in the town of Bristol, to which the state contributed in 1895 $27,037; Butler Hospital for the Insane, which had 183 patients at the close of 1895, partially supported by the state and partially by the interest from almost $300,000 invested funds; the State School for the Deaf, with 60 pupils during 1895, costing the state during the same year $13,428; the State Home and School for Children, in the city of Providence, with 106 children in attendance at the close of 1895, to which the state appropriated $19,032 during the year; and the Rhode Island School of Design, in Providence, 107 pupils in attendance at the beginning of 1896, and about $3,000 contributed by the state for the preceding year.

The total expenditure for public education in Rhode Island in 1899 amounted to $1,570,895, of which

CAPITOL BUILDING, PROVIDENCE.

$470,945 was drawn from the state treasury and $1,236,516 was from city, town and district treasuries. In 1899 the children between the ages of 5 and 16 years numbered 79,825, of whom 64,537 were enrolled in the public schools. Eleven thousand and twenty-five attended Catholic schools; 1,307 attended select schools; and only 9,735 children within the school age were reported as not attending some school. The number of graded schools was 1,098, the number of ungraded 246, the total number of schools 1,344. In 1899 the average length of the school terms was 9 months and 9 days. The male teachers numbered 372, female teachers 1,548. The total wages paid to teachers was $998,315, the average monthly wages of male teachers being $101.83, of female teachers $50.06. The number of high schools was 18, in which 3,436 pupils were enrolled, and from which 366 pupils were graduated during the year. Evening schools to the number of 61 were maintained, in which 7,974 pupils were enrolled, the expenses of all kinds aggregating $46,971. The free public libraries of the state numbered 50, to which the state awarded $5,653 during the year. The total number of volumes was 247,233 and the number of patrons 53,303. The following table shows the amount appropriated by the state during 1895 for educational purposes, other than the public schools:

For the State Normal School	$ 18,999
For the State Home and School	20,462
For the Rhode Island School of Design	1,537
For the Rhode Island Agricultural College	10,000
For teachers' institutes, lectures, addresses, etc.	298
For site and building for the State Normal School,	197,515
For sites, buildings and furniture for schools	267,085
For apparatus and books of reference	15,651
For mileage for pupils of the State Normal School,	2,000

Rhode Island had, in 1901, 412 church organizations, 280 edifices, a total membership of 148,008, which constituted 42.84 per cent of the entire population. The value of the church property of the state was estimated at $7,583,110. The Adventists had 21 organizations; all Baptist bodies, 113; Roman Catholics, 51; Congregationalists, 34; all Methodist bodies, 52; and Protestant Episcopal, 50. In all, 34 different denominations were represented.

The following table relative to the finances of the state is compiled from the report of the state treasurer for 1895:

	Real Estate.	Personalty.	Total.
Whole state, 1894	$295,604,735	$85,530,316	$381,135,051
Whole state, 1895	283,427,125	85,938,543	369,365,668
Dec. dur'g the year	$ 12,177,610	$ 408,227	$ 11,769,383

Total receipts of the state treasurer for 1900	$ 1,518,538
Total payments of the state treasurer for 1895,	1,302,940
Total indebtedness of the cities of the state, 1895,	21,813,353
Total indebtedness of the towns of the state, 1895	23,540,818
Total indebtedness of the state 1901 (funded)	2,300,000

The state institutions, with the exception of those already mentioned, are located on a farm of 538 acres, about seven miles from the city of Providence, and comprise the following institutions, having the number of inmates given at the beginning of 1896:

	Males.	Females.	Total.
State Workhouse and House of Correction	177	85	262
State Asylum for the Insane	313	316	629
State Reform School	249	28	277
State Prison	151	2	153
Providence County Jail	260	26	286
State Almshouse (including 26 boys and 19 girls)	158	156	314

For the support of the state institutions at Cranston there was appropriated for 1895 the sum of $259,079.

At the beginning of 1896 the Rhode Island Military Department was made up of the following: General and staff officers, 29; other commissioned officers, 144; enlisted men—cavalry, 95; artillery 86; naval battalion, 108; infantry and heavy ar

illery, 965: making a total of 1,427. Included in the above were independent organizations numbering 50 officers and 289 enlisted men, a total of 339. Deducting these from the total military force, as above, leaves the National Guard with a strength of 1,088. The state appropriation of 1894 was $104,000; the Federal, mostly in arms, equipments and accouterments, $3,450.

Jan. 1, 1899, there were published in Rhode Island 76 newspapers, of which 15 were daily, 1 triweekly, 4 semiweekly, 47 weekly, 1 fortnightly, 1 semimonthly, and 7 monthly. Papers were published in all the 5 counties of the state, and in 25 of the cities, towns, and villages, of which 4 were county seats.

The following table gives the population of the principal cities of Rhode Island for 1890 and 1900:

City.	1890.	1900.
Providence	132,146	175,597
Pawtucket	27,633	39,231
Woonsocket	20,830	28,204
Lincoln	20,355	8,937
Newport	19,457	22,034
Warwick	17,761	21,316
Central Falls	.....	18,167
Johnston	9,778	4,305
Cranston	8,099	13,343
Cumberland	8,090	8,925
Westerly	6,813	7,541
Burrillville	5,492	6,317
Bristol	5,478	6,901
Coventry	5,068	5,279

State flower, Violet.

The following is a list of the governors of Rhode Island, with their respective terms of office:

Arthur Fenner	1790–1805	William Sprague	1860–63
Henry Smith	1805–06	William C. Cozzens	1863
Isaac Wilbur	1806–07	James Y. Smith	1863–66
James Fenner	1807–11	Ambrose E. Burnside	1866–69
William Jones	1811–17	Seth Padelford	1869–73
Nehemiah R. Knight	1817–21	Henry Howard	1873–75
William C. Gibbs	1821–24	Henry Lippitt	1875–77
James Fenner	1824–31	Charles C. Van Zandt	1877–80
Lemuel H. Arnold	1831–33	Alfred H. Littlefield	1880–83
John B. Francis	1833–38	Augustus O. Bourn	1883–85
William Sprague	1838–39	George P. Wetmore	1885–87
Samuel W. King	1839–43	John W. Davis	1887–88
James Fenner	1843–45	Royal C. Taft	1888–89
Charles Jackson	1845–46	Herbert W. Ladd	1889
Byron Diman	1846–47	John W. Davis	1889–91
Elisha Harris	1847–49	Herbert W. Ladd	1891–92
Henry B. Anthony	1849–51	D. Russell Brown	1892–95
Philip Allen	1851–52	C. W. Lippitt	1895–97
William B. Lawrence	1852	Elisha Dyer	1897–1900
Philip Allen	1852–53	William Gregory	1900–01
Francis M. Dimond	1853–54	C. D. Kimball	1901–03
William Hoppin	1854–57	Lucius F. Garvin	1903–05
Elisha Dyer	1857–59	George H. Utter	1905–
Thomas G. Turner	1859–60		

See Rhode Island, Vol. XX, pp. 538–539.

RHODES, Rt. Hon. Cecil John, P.C., D. C. L., an English colonial statesman whose ability has won for him the title of the Napoleon of Africa, was born at Bishop Stortford, Hertfordshire, England, July 5, 1853. His grandfather was a well-to-do dairyman in the Islington suburb of London, to whom tradition assigns 999 head of cattle and the inability to possess an even 1,000. His father, the Rev. Francis William Rhodes, was for many years vicar of St. Michael's Church in the parish of Bishop's Stortford, where a stained-glass window commemorates the esteem in which the villagers held a benign man, with a remarkable virtue for ten-minute sermons. Cecil, the third son, a weekly youth, received his early education at the local grammar-school, one of King Edward VI's foundation, as did his numerous brothers, of whom one died in the heart of Africa and others did honor to the rolls of the English army. A term or two at Oriel College, Oxford, followed, and then physicians ordered him to the Cape. He landed with moderate means and took to diamond-mining, ultimately consolidating all the mining interests and controlling the diamond supply of Africa. The warm African climate had made a mountain of energy of a weedy English youth. Cape politics soon attracted him. He entered the colonial Parliament as member for West Barkly and later took office in the ministry of Sir Thomas Scanlon. On the fall of Sir Gordon Sprigg's Ministry, July 17, 1890, he became Premier of the colony. In 1891 he visited England, and while there donated $50,000 to the Irish Home Rule fund. In September, 1893, he took the field against Lobenguela, the warlike king of Matabeleland, with a flying squadron of 600 troopers. In vain did the fearless impis of fierce Matabeles charge the moving square. The Maxim, Gardner and Nordenfeldt machine-guns made as short work of these warlike Naboths as the white gold-seekers did of their vineyards. Charges of slaughtering surrendered prisoners were freely brought against the irregular troops of the Chartered South African Company composing the force. Toward Equatoria they marched, and slaughtered savages as they went. Rhodes had set his mind on a telegraph-line, if not a railroad, to Cairo. Lobenguela tersely called him "The man who eats a country for breakfast," and Lobenguela's kraal at Buluwayo was made the new capital of Rhodesia very soon after Rhodes marched into the land. Loyal to the crown, his deeds and his utterances marked him as a man too imperial for a crown to rule. England began to conciliate this political meteor, who added more to the empire's bounds in a month than armies had won in a century. He was called home and sworn of the Privy Council. But the drawing-rooms of Belgravia were too small a world for the man whose breathing-space was the great Karroo Desert, and thither he returned.

C. J. RHODES.

In the African Hinterland gold-fields were on every hand, and the soil was a second Eden in fertility. Then came the Uitlander agitation in Johannesburg, led by his brother, Colonel Francis W. Rhodes. Of the Cape Premier's knowledge of all

the proceedings, no one questions. None knew better than he that a conflict was bound to come between a majority of Anglo-Saxons deprived of the franchise and a Boer oligarchy. His policy had been Fabian in tactics, but his impetuous lieutenant, Dr. L. S. Jameson (q.v., in these Supplements), flew across the Transvaal border, with results that brought the secret policy of South African administration into notoriety. Rhodes's attitude may be accounted for by his knowledge of Boer intrigues with Germany, but the fact remains of his complicity in the Jameson raid. Resigning from the Cape government and again visiting Downing Street, he hurried back to quell an extensive Matabele revolt and then sat down to assist in administering the government of the land which bears his name. "His aim," as a keen critic said, "is nothing less than the erection of a real British Empire with home rule for all the parts, with an equal citizenship throughout, and with full representation of all the British regions in the central governing bodies. In that case, South Africa would take her place with Australia, Canada and the rest, and all British soil would be deemed equally sacred. This idea entertained by Mr. Rhodes is the only hope for the permanence of the political affiliation of those regions now pertaining to the British crown and known as the 'British Empire.' Other men hold this conception and are working for its realization; but Mr. Rhodes, both in ability and in virtue of his actual place in imperial affairs, stands head and shoulders above them all."—His elder brother, Francis William Rhodes, was a dashing cavalry officer, a trusted aide of the present commander-in-chief, Lord Wolseley. He saw sharp service in Egypt, was aide-de-camp to a Lord-Lieutenant in Ireland, and then, magnetically attracted to his brother's star rising in Africa, though colonel commanding the First (Royal) Dragoons, he went to Johannesburg to superintend mining interests there. He took a leading part in the insurrectionary movement, and enrolled the Uitlanders against the Boers. On the fiasco of Jameson's raid, he, with others, was arrested and tried before an Orange Free State judge and sentenced to death. The punishment was at once commuted to a fine of $125,000, brief imprisonment and banishment in default of abjuring civil rights. Colonel Rhodes then left the Transvaal.

Early in 1897 Mr. Cecil Rhodes went to England, where, despite the Jameson Raid, he received a popular ovation. A select committee of Parliament, however, censured him for aiding the reform movement among the Uitlanders of the Transvaal, though Mr. Rhodes affirmed that Jameson went armed into the burgher republic without his authority. Mr. Chamberlain, nevertheless, could say that, "Although Mr. Rhodes had committed as great a fault as a statesman could commit, nothing had been proven, and there existed nothing against his personal character as a man of honor." In June, '97, Mr. Rhodes returned to South Africa, and after negotiating for peace with some native chiefs who had been fighting in Mashonaland he resumed his labors on behalf of the chartered territories (Rhodesia), north and west of the Transvaal. When war with the Boer republics broke out (Oct., 1899), he went to Kimberley, the seat of the De Beers diamond mines, and remained there during its long investment by the Boers. While there he did much to stiffen the defence until relief came and the siege was raised (Feb., 1900). At his own expense, he raised and equipped a force of 400 men for the defence of the beleaguered town. Died at Cape Town, Mch. 25, 1902.

RHODESIA, a popular and complimentary name given to that part of South Africa which lies between the British Vaal River colony on the south, the Congo Free State and German East Africa on the north, and German Southwest Africa and Angola on the west. To the indomitable purpose of Cecil John Rhodes (q.v., in these Supplements) is due the inclusion of this vast and richly auriferous territory in the British Empire. The gold yield for three years (Sept., 1898, to Sept., 1901) was 284,856 oz. The yield for 1901 was 153,679 oz.

Rhodesia is divided by the River Zambesi into a southern portion, known as Matabeleland and Mashonaland, and a northern portion called Nyassaland. Its story is entirely one of conquest. The *auri sacra fames* brought prospectors into conflict with the warlike Matabeles, whereupon the military police of the Chartered South African Company crushed the power of Lobenguela and his athletic warriors. Gold, iron and coal are found in considerable quantities; the ancient ruins and gold-workings of Mashonaland being considered by some the site of the Ophir of Solomon's days. The fertility of the land as pasturage is great. A railroad toward the northern boundary is under construction, and telegraph lines already reach to Buluwayo, the capital, to Fort Charter and Fort Salisbury. The possession of Rhodesia gives England an outlet to the equatorial provinces of the Nile, and affords feasibility to Cecil Rhodes's long-cherished plan of a railway and telegraph line from the Cape to Cairo. See Africa, in these Supp'ts.

RHUS, a genus of plants of the family *Anacardiaceæ*, commonly known as sumachs. They are shrubs or trees, with ample terminal or axillary panicles of small flowers, mostly compound leaves and dry or berry-like fruit. Besides the various well-known sumachs, the genus contains the smoke-tree (*R. cotinus*), poison ivy (*R. toxicodendron*), and poison sumach (*R. venenata*). See Japanning, Vol. XIII, p. 603.

RHYS, John, a British philologist; born near Ponterwyd, in Cardiganshire, June 21, 1840; after a course at Bangor Normal College he entered Jesus College, Oxford. He was elected to a fellowship at Merton in 1869, and next continued his studies at the Sorbonne, Heidelberg, Leipsic and Göttingen, returning in 1871 to become inspector of schools for Flint and Denbigh. In 1877 he was appointed professor of Celtic in the University of Oxford, and in 1881 was elected to a fellowship at Jesus College. His *Lectures on Welsh Philology* (1877), and *Celtic Britain* (1882), confirmed the reputation for erudition which he had already gained by his contributions to Kuhn's *Beiträge zur Vergl. Sprachforschung*.

the *Revue Celtique*, and the *Archæologia Cambrensis*. He gave the Hibbert lectures on *Celtic Heathendom* in 1886; at the close of 1889 the Rhind lectures on *The Early Ethnology of the British Isles*, at Edinburgh; in 1891 he published *Studies in the Arthurian Legends;* and in 1892 *Inscriptions and Languages of the Northern Picts*.

RIAZAN. See RYAZAN, a town in Russia. See Vol. XXI, p. 124.

RIBALTA, FRANCISCO, a Spanish artist; born in Castillon de la Plana, in 1551. He studied at Valencia, and later at Rome. His first work on his return home was *Cura*, for Corpus Christi College. His coloring was rather harsh. He was a good draftsman, and knew anatomy thoroughly. His pictures are in churches in all the larger cities of Spain. He died in Madrid, Jan. 12, 1628.

RIBBECK, JOHANN KARL OTTO, a German philologist; born in Erfurt, in 1827. In 1859 he was made professor of ancient languages in the University of Berne; in 1862, at Kiel; in 1872, at Heidelberg, and in 1877, at Leipsic. His chief publications are *Scenicæ Romanorum Poesis Fragmenta; Die Römische Tragödie im Zeitalter der Republik* (1875); *Biography of Friedrich Ritschl* (1881); and *Geschichte der Römischen Dichtkunst*. He also edited a critical edition of *Virgil*.

RIBEIRO, BERNARDIM. See PORTUGAL, Vol. XIX, p. 571.

RIBOT, ALEXANDER FÉLIX JOSEPH, a French lawyer and statesman; born at St. Omer, Feb. 7, 1842. He studied law in Paris, and was first secretary of the bar society in 1870; in 1875 appointed Director of Criminal Affairs and Pardons; in 1878 was elected to the Chamber from the second circumscription of Bologne-sur-Mer, and became one of the leaders of the moderate republican element; was re-elected in 1881; in 1886 failed to obtain re-election, and retired from public life until 1887, when he was returned from Pas-de-Calais; in 1889 from the circumscription of St. Omer; held the portfolio of Foreign Affairs in M. Freycinet's cabinet in 1890 and retained it in M. Louvet's administration. Upon the fall of the Louvet government on account of the Panama scandals, M. Ribot became president of the cabinet (January, 1893), and Minister of the Interior. His government was overthrown in March, 1893. In January, 1895, upon the election of Faure to the Presidency, M. Ribot was again made Premier, and remained in office until the October following, when he was susperseded by M. Bourgeois. M. Ribot was always a moderate republican. He was one of the strongest opponents of General Boulanger's schemes.

RIBOT, AUGUSTIN THEODULE, artist; was born in the Department of Eure, France, on August 8, 1823, and studied under Glaize in Paris. He won a medal of the third class at the Universal Exposition of 1878, and was decorated with the Legion of Honor. He excelled in painting religious scenes and portraits, and a number of his works are in public galleries. He died on September 11, 1891. W.F.J.

RIBOT, THÉODULE ARMAND. See EVOLUTION, Vol. VIII, p. 671.

RIBS. See ANATOMY, Vol. I, p. 659.

RICASOLI, BARON BETTINO, statesman; was born at Florence, Italy, on March 9, 1809, and was educated at Pisa and Florence. He became much interested in scientific agriculture, and did a great work for Italy in that department of industry. He was the author of valuable books on the cultivation of grapes, olives and mulberries, and for ten years worked with much success at the drainage and reclamation of the Tuscan Maremma. In 1859 he became the leader of the party opposed to the then grand duke of Tuscany, and, upon the flight of the latter, was made for a time dictator of the Duchy. He then joined Victor Emmanuel in his efforts for Italian unity, and was appointed by that king as governor of Tuscany. Upon the death of Cavour, in 1861, he was made prime minister, but a year later was constrained to resign because of the hostile intrigues of Rattazzi. He was recalled to office in June, 1866, but once more resigned in April of the following year, and then retired wholly and permanently from public life. He continued his interest in agricultural industry to the end of his life, and by example and instruction did a greater work than most men of his time for the rehabilitation of his country. He died at Rome on October 23, 1880, and his *Letters and Papers* were published in 1886–89. W.F.J.

RICCI, LUIGI, soldier and educator; was born in Italy, and was educated at Padua. He served with Garibaldi in 1866, and fought in the French army in 1870–71. Since 1871 he has lived in London, where he is a teacher in the University of London, a professor in King's College, etc., and the author of a number of Italian and other text-books. W.F.J.

RICE, INDIAN, WATER-RICE, OR WILD RICE, common names of *Zizania aquatica*, a common water-grass of the central and western United States. It is tall and reed-like, with large leaves, an ample terminal panicle, and slender grains, collected for food by the Indians.

RICE, ALLEN THORNDIKE, editor; was born in Boston, Massachusetts, on June 18, 1853, spent much of his boyhood abroad, and was educated at Oxford and at the Columbia College law school. In 1876 he purchased *The North American Review* and completely transformed it, giving it vastly increased popular interest and an extended circulation. In 1879 he organized the Charnay expedition, to investigate archæological remains in Mexico and Central America. In 1884 he became proprietor of *Le Matin* newspaper, of Paris; in 1886 was a candidate for Congress but was defeated; and in 1887 was one of the leaders in the ballot reform movement. He was appointed Minister to Russia by President Harrison in March, 1889, but died on May 16 following. He edited *Reminiscences of Abraham Lincoln* (1866), and contributed to *Ancient Cities of the New World* (1887). W.F.J.

RICE-BIRD, a name used in the rice-growing regions of North America for the bobolink (*Dolichonyx*). The bird passes the winter in the Southern

states and adjacent islands. In the spring it migrates far north, and is generally known as the bobolink. In Pennsylvania it is called reed-bird. In the autumn it returns to the South, and feeding upon the rice, becomes fat, and is esteemed as a table delicacy.

RICHARDS, T. Addison, artist and author, was born in London on December 3, 1820, and came to New York in 1831. The next year he wrote an illustrated story of his voyage. Beginning at the age of eighteen, he wrote much for publication, illustrating his own books and articles, and for many years was a constant contributor of illustrations, of landscapes and other pictures, to *Harper's Magazine* and other periodicals. In 1858 he became the principal of the women's school of design at the Cooper Institute, New York. He was president of the New York Sketch Club, a founder of the Artists' Fund Society, and in 1851 was elected to the National Academy of Design. He was made professor of art in New York University in 1867 and filled the place for twenty-five years, and thereafter was emeritus professor. He is best known for his landscapes, which hold a high place in American art. He died in New York on June 30, 1900. W.F.J.

RICHARDS, William Trost, artist, was born in Philadelphia on November 14, 1833, and was educated in the high school of that city. He studied art in Florence, Rome and Paris, and thereafter made several visits to Europe for painting and exhibition of his works. For many years he had his studio in Philadelphia, but later removed to Newport, R. I. Examples of his work are to be seen in the Metropolitan Museum of Art, New York; the Pennsylvania Academy of Fine Arts, Philadelphia; the Corcoran Gallery, Washington, D. C.; and the Schauge Gallery, Hamburg. He received a medal at the Centennial Exposition at Philadelphia in 1876, a medal at the Paris Exposition of 1889, and the Temple medal of the Philadelphia Academy of Fine Arts. He was elected many years ago a member of the National Academy, and of the American Water-Color Society. W.F.J.

RICHARDSON, Sir Benjamin Ward, physician; was born in 1828 at Somerby, Leicestershire. Destined for the medical profession, he entered Anderson's College, Glasgow, and when his work was interrupted by sickness he became assistant to various practitioners. In 1854 he was admitted M.A. and M.D. of St. Andrews, and 1856 became a member of the Royal College of London, where he lectured on *materia medica*. He lived at Mortlake, where he met Thackeray, Jerrold, Hepworth Dixon, and others well known in literature. Settling in London he became physician to various dispensaries, the Press Fund and Literary Fund, besides lecturing on forensic medicine and hygiene as well as physiology. He won the Fothergillian Gold Medal in 1854, the Astley Cooper prize of 300 guineas in 1856. In 1875 he delivered at Brighton a powerful address, *Hygeia*, to point out the value of sanitation. In the same year he lectured on *Alcohol*, which he considered so powerful a drug as to be useful only in an emergency. He introduced fourteen anæsthetics, among them methyline bichloride, and was assiduous in inventing means to relieve pain and lengthen human life. His inventions include a double valve inhaler for chloroform, an ether spray tube, and a mask for workers in dust. He discovered the controlling influence of nitrite of amyl over tetanus. He was among the first to recommend the bicycle. He was the originator and editor of the *Journal of Public Health*. His scientific articles were very numerous, but he found time to write biographies, plays, poems and songs. At the time of his death, in 1896, he was engaged upon a book called *Vita Medica*, chapters of medical life and work. The *Asclepiad* contains researches of a similar character. W.R.B.

RICHARDSON, Charles Francis, educator, was born at Hallowell, Maine, on May 29, 1851, and was graduated from Dartmouth College in 1871. He was on the editorial staff of the New York *Independent* in 1872–78, and of the *Sunday-School Times* in 1878–80, and was editor of *Good Literature* in 1880–82. Since 1882 he has been professor of English in Dartmouth College. He has written *A Primer of American Literature*, *The College Book*, *The Cross* (poems), *The Choice of Books*, *American Literature*, *The End of the Beginning* (a romance), and other works. W.F.J.

RICHARDSON, Henry Hobson, architect, was born in Louisiana, on September 29, 1838, and was graduated from Harvard College in 1859. He became an architect, and after some years' practice was graduated from the École des Beaux Arts in Paris. Among his early works were a church, a bank, and a railroad station, which gave small promise of his later genius. In time, however, he developed into one of the foremost architects of America and indeed of the world in his time. Among his works are the noble tower of the Brattle Street Church in Boston, Sever Hall and Austin Hall at Harvard University, the State Capitol at Albany, N. Y., the public buildings of Allegheny County, Penn., the Chamber of Commerce at Cincinnati, the Ames Memorial Hall at North Easton, Mass., and the Craig Memorial Library at Quincy, Mass. His masterpiece, however, is Trinity Protestant Episcopal Church, in Boston, which he designed at the close of his life, while suffering from a mortal disease, and which he did not live to see completed. He died at Brookline, Mass., on April 28, 1886. (See Architecture in these Supplements.) W.F.J.

H. H. RICHARDSON.

RICHARDSON, James Daniel, lawyer and legislator, was born in Tennessee on March 10,

1843, and was a soldier in the Confederate army. After the war he became a lawyer, was a member and speaker of the House, in the Tennessee legislature in 1871–72, and State Senator in 1873–74. Since 1885 he has been a representative in Congress. W.F.J.

RICHARDSON, WILLIAM ADAMS, jurist and financier, was born at Tyngsborough, Mass., on November 2, 1821, and was graduated from Harvard College in 1843, and from the Harvard Law School in 1846. He soon rose to prominence at the bar, and was entrusted with the revision of the statutes of Massachusetts in 1855–59. He was made judge of probate in 1856, and judge of probate and insolvency in 1858. This office he held until 1872, when he resigned it to perform the duties of assistant-secretary of the U. S. Treasury, to which office he had been appointed in 1869. He was fiscal agent of the treasury in Europe, and managed the delivery in London of $130,000,000 in United States bonds. In March, 1873, he succeeded George S. Boutwell as Secretary of the Treasury, and skilfully managed the transfer of the $15,000,000 of the Geneva award, payable in gold, from England to America without any disturbance of the money market. In the financial panic of 1873 he scrupulously kept the treasury from embarrassment, and he resigned the treasury portfolio in 1874 with the reputation of a sound and able financier. He was made a judge of the court of claims at Washington in 1874, and chief justice of that court in 1885. He was a lecturer in the law school of Georgetown University for some years after 1881. He died on October 19, 1896. W.F.J.

RICHARDT, CHRISTIAN ERNST (1831–93). See DENMARK, Vol. VII, p. 82.

RICHELIEU, a river and canal. See ST. LAWRENCE, Vol. XXI, p. 190.

RICHEPIN, JEAN, a French poet and novelist; born in Médéah, Algeria, Feb. 4, 1849, where his father was army surgeon. He was educated at the lycées Napoleon and Charlemagne, in Paris; began the study of medicine, and in 1868 entered the Normal School in the department of letters. During the Franco-Prussian War he was editor of *L'Est* in Franche Comté, returned to Paris and published the novel, *Jules Vallès* (1872), and the drama *L'Étoile*, written in collaboration with André Gill; in 1876 was imprisoned and fined for publishing his *Chanson des Gueux;* after being liberated was a sailor for a time, and then returned to Paris, became editor of the *Gil Blas*, and devoted himself entirely to literature. M. Richepin, in prose and verse, is one of the most prominent representatives of the realistic or naturalistic schools of Paris, and, faithful to its principles, had no regard for conventionalities, literary, moral or social. His works have been often attacked and frequently suppressed. His poems, however, which are mostly lyrics, are bold and graceful, and all his work bears the stamp of individuality. Among his poetry might be mentioned *Les Caresses* (1877); *Les Blasphèmes* (1884); and *La Mer* (1886), a collection of poems. He also published the novels *Madame André* (1874); *Les Morts Bizarres* (1878), a collection of short stories written in prison; *Sophie Monnier* (1884); *Truandailles;* and many others. For the stage he wrote *La Glu* (1883); *Nana Sahib* for Sarah Bernhardt, in which Richepin took the principal male rôle when Mme. Bernhardt's leading man was taken sick; and *Monsieur Scapin*, in verse, which was produced at the Comédie Française in 1886. He also wrote the libretto for Massenet's *Le Mage.*

RICHFIELD, Utah, the seat of Sevier County, a city on the Sevier River, and on a division of the Rio Grande Western railroad, 150 miles S. of Salt Lake City. It is a trade center, with farming, gold and silver mining industries. Population, 1900, 1,969. C.L.S.

RICHFIELD SPRINGS, New York, a town and village of Otsego County, a fashionable health resort at the head of Schuyler or Canaderaga Lake, and the terminus of a branch line of the Delaware, Lackawanna and Western railroad, 12 miles N.W. of Cooperstown and 60 miles E. of Albany. Its sulphur springs are of repute for skin diseases, and it has some knitting and cap industries. Population, 1900, of village, 1,537. C.L.S.

RICHFORD, Vermont, a town and village of Franklin County, on the Missisquoi River, and on the Central Vermont and Canadian Pacific railroads, 66 miles N.W. of Montpelier. It has lumbering, farming, dairying, milling, and furniture-making industries. Pop., 1900, of village, 1,513. C.L.S.

RICH HILL, Missouri, a mining city of Bates County and an important railway junction of divisions of the Kansas City, Fort Scott & Memphis, and the Missouri Pacific railroads, 80 miles south of Kansas. It is the commercial center of a populous region, engaged in coal, iron, lead and zinc mining, and in farming, and has supplemental industrial establishments, including foundries, smelting works, lumber and flour mills, brick and tile factories, ice-plants, breweries and distilleries. Population, 1890, 4,008; 1900, 4,053. C.L.S.

RICHIBUCTO, New Brunswick, the seat of Kent County, a town and port of entry on the estuary of the Richibucto River, forming the safe and commodious Richibucto harbor opening into the Gulf of St. Lawrence at the northern end of Northumberland Strait. It is on the Northern railroad, connecting at Kent Junction with the Intercolonial system. Fisheries, lumbering, and ship-building are the chief industries. Population, 800. C.L.S.

RICHLAND CENTER, Wisconsin, the seat of Richland County, a city on Pine River and the terminus of the Lone Rock and Richland Center branch of the Chicago, Milwaukee and St. Paul railroad, 125 miles west of Milwaukee. The county insane asylum is situated here. Farming, stock-raising, and lumbering promote supplemental manufacturing industries. Population, 1890, 1,819; 1900, 2,321. C.L.S.

RICHMOND, Kentucky, the seat of Madison County, a city 110 miles southeast of Louisville, on a small branch of the Kentucky River, and a junction of division lines of the Louisville & Nashville, and the Louisville & Atlantic railroads. It is the center of a coal, iron, lumber, farming and stock-raising region exporting the products of these industries, especially cattle, mules and horses. Population, 1890, 5,073; 1900, 4,653. C.L.S.

RICHMOND, Maine, a town of Sagadahoc County, on a small stream near its confluence with the Kennebec River and on the Maine Central railroad, 44 miles N.E. of Portland. It has lumbering, cotton, shoe and ice-making industries. Population, 1890, 3,082; 1900, 2,049. C.L.S.

RICHMOND, Indiana, the seat of Wayne County, a city and important railway junction 70 miles northwest of Cincinnati and 68 miles east of Indianapolis. It is on the east fork of the Whitewater River, on three divisions of the Pennsylvania lines west of Pittsburg, and is the terminus of the Grand Rapids and Indiana main line. From a post village of 1,400 inhabitants in 1850, Richmond has developed into a well built and prosperous manufacturing city, noted for its municipal enterprise, its public buildings and institutions which include Earlham College (q.v.) founded by the Society of Friends, Old Ladies' Home, Wernie (Lutheran) Orphans' Home, and the Eastern Indiana Insane Hospital. Its considerable manufactures are chiefly of agricultural machinery and requisites. Population, 1890, 16,608; 1900, 18,226. C.L.S.

RICHMOND, Missouri, the seat of Ray County, a city 36 miles N.E. of Kansas City on the Atchison, Topeka & Santa Fé railroad. Its industries are connected with the coal mining and farming of the neighborhood, and it has mills, foundries, and canning factories. Population, 1890, 2,895; 1900, 3,478. C.L.S.

RICHMOND, Canada, a town of Richmond County, southern Quebec, 40 miles north of Sherbrooke, on the St. Francis River, opposite Melbourne, one of the county seats of Richmond and Wolfe counties. It is reached from Richmond Station to the south, on two divisions of the Grand Trunk railroad, with railroad construction and repair shops. Population, 1901, 2,056; of Richmond Station, 300. C.L.S.

RICHMOND, a village and the capital of Fort Bend County, southeastern Texas, 22 miles S.W. of Houston, on the Gulf, Colorado and Santa Fé, the Galveston, La Porte and Houston and the Southern Pacific railroads; also on the Brazos River. Steamboats can ascend the river as far as Houston. It does considerable shipping trade in cotton, corn, hides and sugar. Population, 1900, estimated at about 1,000.

RICHMOND, the capital of Virginia. It is the seat of Richmond College (Baptist), established in 1832; and in 1902 had 15 instructors, 216 pupils, and a library containing 12,200 volumes. Among the most recent buildings and monuments that have been erected are a new public library, a statue of Gen. W. C. Wickam in Monroe Park, and a bronze statue of General Robert E. Lee at Lee Circle, in the western part of the city. The city now contains 5 public libraries, with an aggregate of 65,000 volumes, and 6 daily papers, 21 weekly and 14 monthly periodicals. The following will show the amount of business transacted by some of the leading manufacturing industries of the city:

Industry.	Number of Establishments.	Aggregate Investment.	Average Number Employees.	Average Total Wages.	Value of Products.
Tobacco, chewing, smoking, and snuff....	17	$2,088,661	2,580	$738,800	$5,223,733
Tobacco, cigars and cigarettes.....	22	521,839	2,399	675,648	4,389,745
Tobacco, stemming and rehandling.....	10	443,950	687	91,642	924,325
Baking and Yeast Powders.....	6	150,000	116	53,754	598,313
Fertilizers.....	6	2,163,731	450	184,018	1,045,063
Foundry and machine shop products.....	18	5,164,103	1,636	861,334	2,594,186

Population, 1890, 81,388; 1900, 85,050. See also Richmond, Vol. XX, pp. 560–561.

RICHMOND, George, an English portrait-painter; born in London, March 28, 1809; entered the schools of the Royal Academy in 1824; began painting in water-colors, and later in oils; was elected associate of the academy in 1859, and academician in 1869. He painted almost 3,000 portraits, many of them of prominent men and women, among which are *The Earl of Elgin* (1860); *The Duke of Buccleuch* (1865), and *Sir Moses Montifiore* (1875). Among his other paintings are *Agony in the Garden* (1858), and *Sunset from Hyde Park* (1861). He was conscientious and painstaking, frequently to such an extent that his work appeared over-labored. What his paintings lack in spontaneity is made up for by their carefulness of execution. Died in London, March 19, 1896.

RICHMOND, William Blake, an English artist, son of George Richmond; born Nov. 29, 1843. He studied at the Royal Academy, and in 1859–60 traveled in Italy; in 1865 went to Rome to study. In 1870 he settled in England, and afterward followed art as a profession; was Slade professor at Oxford from 1878 to 1883, the position which Ruskin filled before and after him, and was elected associate of the Royal Academy. Among his paintings are *Procession of Bacchus* (1868); *Prometheus Bound* (1873), and *Electra at the Tomb of Agamemnon;* besides portaits of Holman Hunt, Darwin, Princess Louise, and others.

RICHTER, Gustav Carl Ludwig, a German portrait-painter; born in Berlin, Aug. 31, 1823; studied in the Berlin academy and in Paris; was made professor in the Berlin academy and member of the academies of Vienna and Munich;

obtained the grand medal in Berlin (1864); other medals in Paris, Vienna, and Philadelphia. He is best known for his portraits, among which are *Queen Louise* (1879), in the Cologne museum, and the *Hon. George Bancroft*, exhibited at the Philadelphia Exposition of 1876. His Oriental scenes, *Odalisque; The Raising of Jairus' Daughter*, in the National Gallery at Berlin, and others, show good drawing and very rich color effects. His *Victory* is in the Museum of Art, New York. Died in Berlin, April 3, 1884.

RICHTER, Hans, a German musical conductor; born in Raab, Hungary, April 4, 1843. In 1859 he entered the Conservatorium in Vienna and studied the horn under Kleinecke and theory under Lechter; played the horn in the orchestra of the Kärnthnerthor; in 1868 was made conductor of the Hof-and-National Theater, Munich; in 1871 chief conductor of the national theater at Pesth; at the Court Opera Theater in Vienna (1875); in 1876 conducted the Bayreuth Festival; in 1879, 1880 and 1881 conducted concerts in London, and attracted great attention by using no scores. Richter was one of the foremost orchestra conductors, a prominence which perhaps he owed to his practical knowledge of the technique of the instruments in an orchestra.

RICHTOFEN, Baron von, German statesman; was born at Jassy in 1847, served in the German wars of 1866 and 1870, and then entered the diplomatic service of the empire. He was director of colonial affairs in 1896–97, and since 1900 has been Secretary of State for Foreign Affairs. W.F.J.

RICHTOFFEN, Ferdinand, Baron von, geographer and geologist; was born at Carlsruhe, in Prussian Silesia, on May 5, 1833, and in 1860 accompanied a Prussian expedition to Asia. Thereafter for twelve years he traveled in China, Japan, Siam, Burmah, Java, and California, making geographical and geological researches. Upon his return to Germany in 1872 he became president of the Berlin Geographical Society, professor of geology at Bonn in 1875, of geography at Leipsic in 1883, and at Berlin in 1886. He has written upon California, a monumental work upon *China* (1877–83), and a great *Atlas of General Geography* (1883). W.F.J.

RICHWOOD, a village of Union County, central-western Ohio, 35 miles N.W. of Columbus, on the New York, Lake Erie and Western railroad; it is in an agricultural district, and has two large flour-mills, two steam tile-mills, several large grain-elevators, a planing-mill, two private banks and two weekly papers. Population, 1890, 1,415; 1900, 1,640.

RICINUS. See Castor Oil, Vol. V, p. 174.

RICO, Colorado, the seat of Dolores County, a town near the San Miguel Mountains, on a tributary of the Dolores River, and on a division of the Rio Grande Southern railroad, 35 miles northwest of Durango (96 miles by rail). It is a commercial center and supply base for the coal, iron, gold, zinc, copper and silver mines of the region, and has smelting establishments and mills for the reduction of ores, with some minor local industries. Population, 1890, 1,134; 1900, 811. C.L.S.

RIDDLE, Matthew Brown, theologian, was born at Pittsburg, Penn., on October 17, 1836, and was graduated from Jefferson College, Pennsylvania, in 1852, and from the New Brunswick, N. J., Theological Seminary, in 1859. He was adjunct professor of Greek at Jefferson College in 1857–58, chaplain in the Army of the Potomac in 1861, and pastor of a Dutch Reformed Church for eight years. He was professor of New Testament exegesis in the Hartford, Conn., Theological Seminary in 1871–87, and since the latter year has filled a like place in the Western Theological Seminary at Allegheny City, Penn. He was a member of the American committee on revision of the New Testament, has edited a number of commentaries, Sunday School lesson notes, and other religious works, and has been a prolific contributor to encyclopædias, reviews, and religious and literary periodicals. W.F.J.

RIDEAU, a river and canal. See Ottawa, Vol. XVIII, p. 71.

RIDGEFIELD, a town of Fairfield County, southwestern Connecticut, 28 miles N.W. of Bridgeport, on the New York, New Haven and Hartford railroad; in an agricultural district, and makes a specialty of sending milk to New York; has quarrying and grinding of feldspar and quartz; is a popular summer resort, and has a public library and several country residences of New Yorkers. Population 1900, 2,626.

RIDGETOWN, a town of W. Elgin County, Ontario, Canada, 50 miles S.W. of London, on the Michigan Central Railroad. It has flour, woolen, and lumber mills, and two weekly papers. Population 1891, 2,254; 1901, 2,405.

RIDGEVILLE, a village of Randolph County, eastern Indiana, 21 miles N.E. of Muncie, on the Grand Rapids and Indiana and the Pittsburg, Cincinnati, Chicago and St. Louis railroads. It is the seat of Ridgeville College (Congregational), a coeducational institution organized in 1892, and having in 1899, 6 instructors, 88 students, and a library containing 3,000 volumes. Population 1890, 922; 1900, 1,098.

RIDGWAY, Robert, scientist, was born at Mount Carmel, Illinois, on July 2, 1850, and received a common school education. He early turned his attention to ornithology, and in 1867–69 served under the late Clarence King as ornithologist to the U. S. Survey of the 40th parallel, in California, Nevada, Idaho, and Utah. He was a founder, and has been president of the American Ornithologists' Union, is a member of the Zoölogical Society of London and of the British Ornithologists' Union, and has been identified with several international ornithological congresses. Since 1880 he has been curator of the division of birds in the U. S. National Museum at Washington. He has written *A History of North American Birds* (with Spencer F. Baird and T. M. Brewer), *A Manual of North American Birds*,

A Nomenclature of Colors for Naturalists, *The Ornithology of Illinois*, and a great number of papers and essays upon ornithological topics.

W. F. J.

RIDPATH, JOHN CLARK, historian and educator, was born in Indiana on April 26, 1840, was self-educated in boyhood, and was graduated from Indiana Asbury, now DePauw, University in 1863. He was principal of Thorntown Academy in 1864, superintendent of schools in Lawrenceburg, Ind., in 1866, and in 1869 became a professor in Asbury (DePauw) University, at first of English literature and then of belles lettres and history. In 1879 he became vice-president of the university, and it was largely through him that the institution received its splendid endowment from Mr. DePauw (q. v.). He was a voluminous writer of historical and other works, his bibliography including *An Academic History of the United States*, *A Popular History of the United States*, *An Inductive Grammar of the English Language*, *The Life and Works of Garfield*, *A History of the World*, *Alexander Hamilton*, *The Trial of Guiteau*, *A Cyclopædia of Universal History*, and *The Epic of Life*. He was one of the editors of *The People's Cyclopædia*. He died on July 31, 1900. W. F. J.

RIEDESEL, FREDERICK ADOLPHUS, BARON VON, soldier, was born in Germany on June 3, 1738, and entered the army of the Duke of Brunswick in the Seven Years' War, being a colonel on the staff of Prince Ferdinand. When George III sought levies for his American army, Baron von Riedesel was selected to command some of the troops from Hesse, with the rank of major-general. He came to America early in the Revolution, and was with Burgoyne in his disastrous campaign. At Saratoga he was captured and was held a prisoner until 1779, when he was released by exchange. He did little more in the Revolution, but upon his return to Germany was made a lieutenant-general. He died on January 6, 1800. W. F. J.

RIEHL, WILHELM HEINRICH VON, a German novelist, publicist, and historian; born in Bieberich, May 6, 1823. He was educated at Giessen and elsewhere, and for ten years was editor of journals in Frankfort, Heidelberg, and Wiesbaden; in 1853 became professor at Munich, and in 1862 was elected to the Munich Academy of Sciences. He wrote *Natural History of the People* (1851–69); *Studies of the Civilization of Three Centuries* (1859); *German Labor* (1862); *History of Civilization* (1865); *New Book of Novels* (1867); *Types and Characters of Musicians* (1878); and others. He superintended the publication of the geographical and ethnographical magazine, *Bavaria*, and the *Historical Journal*. Died in Munich, Nov. 16, 1897.

RIEL, LOUIS, a Canadian insurgent, was born in what is now Manitoba in 1844, of French and Indian blood, and was educated at the Jesuit college in Montreal. He was probably of unbalanced mind, if not actually insane, but was possessed of many gifts of leadership, and was fanatical upon the subjects of race and religion. He conceived the scheme of leading a great insurrection against English rule and Protestantism in Canada, and when in 1869 the Northwest Territories of the Hudson Bay Company were transferred to the Dominion of Canada he raised his fellow half-breeds in revolt. He proclaimed himself "general," seized the treasury of the Hudson Bay Company, and organized a government at Fort Garry, declaring the northwest to be an independent empire. He was suppressed by Sir Garnet (afterward Lord) Wolseley in the Red River expedition (q. v., Vol. XX, p. 328, in 1870, but made his escape from the country. In 1873 he was elected to the Dominion Parliament but was not admitted to his seat. Twice afterward he tried to raise rebellions, but failed. He was finally convicted of treason-felony, and put to death on November 16, 1885. W. F. J.

RIF. See MOROCCO, Vol. XVI, p. 856.

RIFLES, MILITARY. See GUNMAKING, Vol. XI, pp. 251–252; and in these Supplements.

RIGDON, SIDNEY. See MORMONS, Vol. XVI, pp. 852–853.

RIGG, JAMES HARRISON, theologian; was born at Newcastle-on-Tyne on January 16, 1821, and entered the ministry of the Methodist Church in 1845. He was chairman of the Second District Synod of London for sixteen years, was one of the first members of the London School Board, has twice been president of the Wesleyan Conference, was a member of the Royal Commission on Education in 1886–88, and has been treasurer of the Wesleyan Missionary Society since 1881, vice-president of the Bible Society since 1887, and principal of the Westminster Training College for Day School Teachers since 1868. He is the author of more than a score of religious and theological works, and contributed the article on METHODISM to this ENCYCLOPÆDIA. He has long ranked among the foremost scholars and theologians of the Methodist Church in Great Britain. W. F. J.

RIGGS, ELIAS, missionary; was born at New Providence, New Jersey, on November 19, 1810, and was a precocious student, teaching himself Hebrew at the age of eleven. Before he was fifteen he entered Amherst College, where, in addition to the regular course, he studied Chaldee and Syriac, the latter from a grammar in Latin. He was graduated in 1829, spent the next three years at Andover Theological Seminary, and was then ordained into the ministry, and at once sailed for Greece as a missionary. For six years he labored diligently in Greece, chiefly at Argos, and then for five years at Smyrna and in other Greek communities of Asiatic Turkey. Thence he proceeded to Armenia, and finally settled in Constantinople. Meantime he translated the Bible into Bulgarian and Armenian, and assisted in translating it into Turkish. In 1856–58 he revisited America and taught Hebrew in the Union Theological Seminary, New York. He was the author of a number of religious works and of Chaldee, Bulgarian, Armenian and Turkish grammars. He died on January 17, 1901. W. F. J.

RIGHT ASCENSION. See ASTRONOMY, Vol. II, p. 669.

RIGI OR RIGHI, Switzerland, a mountain rising 5,902 feet high, between Lakes Lucerne, Zug, and Lowerz, its summit reached by a funicular railroad from Lake Lucerne and one from Lake Zug. On the pine covered slopes are several villages and summer hotels. C.L.S.

RIG-VEDA. See SANSKRIT, Vol. XXI, p. 283.

RIIS, JACOB A., a Danish-American journalist and writer on sociology; born May 3, 1849, at Ribe, Denmark. He acquired a knowlege of the English language by reading English novels, and removed to America in 1870. He was for a time a reporter on the New York *Tribune*, and later police-reporter in New York for the Associated Press, and as such became acquainted with tenement-life in the poorest and most squalid parts of the city. The results of these observations he published in 1890, under the title *How the Other Half Lives*, which attracted immediate attention. In 1892 followed *Children of the Poor*, and in the following year *Nisby's Christmas*, a collection of three stories, the title of the first of which gives the name to the book. Although fiction, they were written as sociological studies and with the philanthropical purpose of attracting attention to the miserable conditions under which life is supported in the crowded neighborhoods of the East Side.

RILEY, CHARLES VALENTINE, entomologist, was born in London, England, on September 18, 1843, studied at Bonn, Germany, and came to America in his seventeenth year. He became a farmer in Illinois, and there began the study of insects. At the age of twenty he was editor of the *Prairie Farmer* in Chicago, and soon afterward began writing for various scientific periodicals. In 1868–77 he was state entomologist of Missouri, issued nine annual reports of great value, and founded and edited the *American Entomologist*. He afterward made a study of the locust plagues of the west, and in order to deal with them and with other insects secured the creation of a National Entomological Commission, of which he was a member. This body worked from 1877 to 1882, and made valuable reports and recommendations concerning the locusts, the cotton worm, the boll weevil, the army worm, the canker worm, and other injurious insects. Mr. Riley was U. S. entomologist from 1878 to 1894, and organized the Bureau of Entomology, which is now an important part of the department of agriculture. Between 1866 and 1884 he visited France several times for the study of phylloxera, and introduced American grape vines into France, as proof against that pest, for which service the French vine growers gave him a gold medal and a bronze statue, and the French government gave him the cross of the Legion of Honor. He introduced the practice of spraying fruit and other trees for the destruction of insect pests, and invented an apparatus for the purpose, and also several insect-killing mixtures. He died on September 14, 1895. W.F.J.

RILEY, JAMES WHITCOMB, author; was born at Greenfield, Ind., in 1853, and acquired his education in the public schools. About 1873 he began to contribute random verses to local newspapers, chiefly in the "Hoosier" dialect of Indiana country folk. The natural simplicity and homeliness of his writings pleased the public, and he soon became widely known in the magazines as the "Hoosier poet" and as one of the most popular "dialect" writers in America. He published his first volume under the pen-name of "Benj. F. Johnson, of Boone," but has since then used his own name. His books include *The Old Swimmin' Hole and 'Leven More Poems* (1883); *The Boss Girl and Other Sketches* (1886); *Afterwhiles* (1888); *Pipes o' Pan at Zekesbury* (1889); *Old-Fashioned Roses* (published in England); *Green Fields and Running Brooks* (1893); *Rhymes of Childhood; Flying Islands of the Night; Poems Here at Home; Armazindy; A Child World; An Old Sweetheart of Mine; Neighborly Poems; Home Folks; The Rubaiyat of Doc Sifers*; *The Book of Joyous Children*, etc. His poems include humorous, serious, and pathetic, and are by no means all in dialect, though those in the Hoosier dialect are by far the most popular and best known. Mr. Riley has often appeared upon the stage as a reader of his own poems, and for a time was thus associated with "Bill" Nye, the humorist. In his early years he was for a time an actor in a traveling company, and had some experience in playwriting and adapting. He has written little in prose, save for newspapers. W.F.J.

J. WHITCOMB RILEY.

RINDERPEST. See MURRAIN, Vol. XVII, pp. 65, 66.

RINDFLEISCH, GEORG EDOUARD. See PATHOLOGY, Vol. XVIII, pp. 366–367.

RINEHART, WILLIAM HENRY, sculptor, was born in Maryland on September 13, 1825, and in his boyhood worked in a quarry on his father's land, where he first showed indications of artistic talent. He next secured employment in a stonecutter's works in Baltimore, and studied art at the Maryland Institute of Design. In 1855–57 he worked and studied in Italy, and in 1858–66 had a studio in that country, in which he produced many fine works of art. He returned to Baltimore in 1866 and produced a noble bronze statue of Roger B. Taney, formerly chief justice of the U. S. Supreme Court, which now stands in Annapolis. After the unveiling of that work, in 1872, he returned to his studio in Rome and there spent the remainder of his life. He made the bronze doors of the Capitol at Washington, and a number of statues of distinguished men. Most of his well known works, apart from portrait statues, are classical or ideal subjects. His *Clytie*,

considered by many to be his masterpiece, is in the Rinehart gallery of the Peabody Institute, to which institution he left his estate and the contents of his studio. He died at Rome on October 28, 1874. W.F.J.

RING–ARMATURE. See ELECTRICITY, §80, in these Supplements.

RINGBONE, a bony tumor growing on the upper or lower pastern bone of the horse's leg. It is generally caused by overwork, but is sometimes found on colts. The growth may form a "ring" about the leg, or appear only on the side of the limb. True ringbone, which affects the ends of the bones, gives rise to obstinate and frequently incurable lameness; while false ringbone, an exostosis near the middle of the long pastern bone, generally gives no inconvenience. R.W.C.

RINGWORM. See SKIN DISEASES, Vol. XXII, p. 132.

RING, MAX, novelist; was born at Sauditz, Silesia, on August 4, 1817, and has been a prolific writer of fiction, among his best known works being *The Children of God* (1851); *The Great Elector and the Alderman* (1851); *The Lost Race* (1867); *The Friends of the Soul* (1871); *Chains of Gold* (1881); *The Victory of Love* (1886), and *Seekers and Strivers* (1888). Many of his works have been translated into English and other languages. W.F.J.

RINK, HINRICH JOHANNES, explorer and ethnologist; was born in Copenhagen, Denmark, in 1819, and spent many years in travels and research in various parts of the world, but chiefly in Greenland, where he was settled as a government administrator. He wrote a number of standard works on Greenland and the Esquimaux, and died at Christiania, Norway, in 1893. W.F.J.

RIOBAMBA NUEVO, Ecuador, the capital of the province of Chimborazo, a city 84 miles northeast of Guayaquil, and nine miles from the ruins of Old Riobamba, at the foot of Chimborazo, which was destroyed by an earthquake in 1797. It is an episcopal see, and a trading center for the surrounding region, on the high road traversing the republic from north to south. Population, 12,000. C.L.S.

RIO CUARTO, a town in the central part of the Argentine Republic, on the river Rio Cuarto 119 miles S. by W. of Corboda. See RIO DE JANEIRO, Vol. XX, p. 577.

RIO DE JANEIRO, the capital of Brazil. Population, 1900, 750,000. See RIO DE JANEIRO, Vol. XX, pp. 577–578.

RIO DE LA PLATA. See PLATE, Vol. XIX, pp. 198–200.

RIO DE ORO, a bay on the Atlantic coast of Africa, lying between the mainland and the Ed-Dajla Peninsula. It belongs to the Spaniards, and has a population, with Adrar, of about 100,000.

RIO GRANDE, a post hamlet of Gallia County, southern Ohio, known only as the site of Rio Grande College, a co-educational institution of Free Baptist denomination, and having in 1901 6 instructors, 133 students and a library containing 3,200 volumes.

RIO GRANDE CITY, a village of Starr County, southern Texas, on the Rio Grande (navigable), 100 miles S.S.W. of San Diego. It has an extensive trade in hides and wool. The inhabitants speak Italian almost exclusively. Population, 1890, 1,968.

RION, a river. See CAUCASUS, Vol. V, p. 221.

RIO NEGRO. See PATAGONIA, Vol. XVIII, p. 358.

RIO NEGRO, the most important tributary of the Amazon on the north side. It rises in Colombia, near lat. 2° N., long. 72° W. Its flow is east-southeast, enters the state of Pará, in Brazil, and joins the Amazon in lat. 3° 10′ S., long. 59° W. The principal affluents are the Cababuri, Uanpes, Padarin and Rio Branco.

RIOUW–LINGGA OR RIOU–LINGA, East Indies, an archipelago of the South China Sea, separated from Singapore at the extremity of the Malay Peninsula, by the great commercial route of Singapore Strait. The archipelago, covering an area of 1,800 square miles, consists of two groups of islands, Riou, the northern, comprising over 30 islands, of which Bintang, containing the capital Riou, is the largest, while Linga, the southern group, includes the large islands of Linga and Singkap, and several smaller ones. The archipelago is rocky and reaches a maximum altitude of 1,620 feet. The islands are densely forested, and yield gambier and hardwoods which, with pepper, rice, sago, and other cultivated products, are exported. The former valuable tin mines have been depleted. Estimated population 80,000, chiefly Malays. C.L.S.

RIPLEY, Ohio, a village and port on the Ohio River in Brown County, opposite South Ripley, Kentucky, on the Chesapeake & Ohio railroad. It is a tobacco-growing and manufacturing center. Population, 1900, 2,248. C.L.S.

RIPON, a city of Fond du Lac County, eastern Wisconsin, 25 miles E. of Montello, and 20 miles W. of Fond du Lac, on the Chicago, Milwaukee and St. Paul railroad. It has several flour and planing mills, and marble-works, foundries and machine-shops, knitting-works and windmill factory. It is the seat of Ripon College, a co-educational, non-sectarian institution organized in 1863, which had in 1901, 21 instructors, 175 students and a library containing 8,000 volumes. Population, 1890, 3,358; 1900, 3,818.

RIPON, GEORGE FREDERICK SAMUEL ROBINSON, FIRST MARQUIS OF, statesman; was born in London on October 24, 1827, the son of the first Earl of Ripon. He succeeded his father as Earl of Ripon and his uncle as Earl de Grey, in 1859, having for seven years preceding been a member of the House of Commons. He was under-secretary of state for war in 1859–61; under-secretary for India in 1861–63; secretary of state for war in 1863–66; secretary of state for India in 1866–68, and lord president of the Council in 1868–73. He was chairman of the Joint Com-

mittee for drawing up the Treaty of Washington in 1871. In 1871–74 he was grand master of the Freemasons, but in the latter year left that order and joined the Church of Rome. Since then he has been viceroy of India in 1880–84; first lord of the Admiralty in 1886; secretary of state for the Colonies in 1892–95, and mayor of Ripon in 1895–96. He was made Marquis of Ripon in 1871. W.F.J.

RIPPLE-MARKS. See GEOLOGY, Vol. X, p. 260.

RISING SUN, a town and the capital of Ohio County, southeastern Indiana, 11 miles S. of Lawrenceburg, on the Ohio River, and on the Cleveland, Cincinnati and St. Louis railroad. It has a graded school, a tannery, two steam flouring-mills and manufactories of furniture and plows. Population 1890, 1,689; 1900, 1,548.

RISTIC OR RISTICH, JOHN, a Servian statesman; born in 1831, in Kragujevatz, and educated in Germany and in Paris. He held various minor appointments from the government of Servia until 1858, when he was made secretary of a deputation sent to Constantinople; later was made Servian minister there; in 1869 became Minister of Foreign Affairs, and after the assassination of Prince Michael in 1868, member of a council of regency to govern the country during the minority of Prince Milan. In 1872 the council became a ministry, Ristich holding the portfolio of Foreign Affairs. He held the same office during the disastrous war of 1877 with Turkey; was sent to the Congress of Berlin, and was very influential in securing the independence of Servia. Upon the abdication of King Milan in 1889, he again became a member of a council of regency, but when King Alexander reached his majority was dismissed from office and banished. Ristich was the leader of the party in Servia which favors Russia.

RISTORI, ADELAIDE. See GRILLO, MARQUISE DEL, in these Supplements.

RITCHIE, ANNA CORA MOWATT, author and actress; was born at Bordeaux, France, in 1819, the daughter of S. G. Ogden of New York. She was educated in New York, and married James Mowatt at the age of sixteen. She wrote an epic poem, *Pelayo*, in 1836, and a play, *Gulzara*, in 1838. In 1841 she began giving public readings, and under the pen-name of "Helen Berkley" wrote several novels—*The Fortune-Hunter* (1842); *Evelyn* (1845), and others. In 1845 she began acting at the Park Theater, New York, and later was associated with E. L. Davenport in *The Hunchback*, and her own plays of *Fashion* and *Armand*. After a successful career she retired from the stage in 1854, having married W. F. Ritchie, editor of the Richmond, Virginia, *Enquirer*. She then resumed literary work, and produced *The Autobiography of an Actress* (1854); *Mimic Life, or Before and Behind the Curtain* (1855); *Twin Roses* (1857); *Fairy Fingers* (1865); *The Mute Singer* (1866); *The Clergyman's Wife* (1867), and *Italian Life and Legends* (1870). Her health was broken by her attention to her invalid and dying father, and in 1861 she went to Italy, where most of her life thereafter was spent. Her husband died in 1868, and she died in London on July 28, 1870. W.F.J.

RITCHIE, ANNE ISABELLA (THACKERAY), an English novelist, daughter of the novelist William Makepeace Thackeray; born in Albion Street, London, in 1838. Several years of her childhood were spent in Paris, but she has passed the greater part of her life in Kensington. Her first published work was *The Story of Elizabeth* (1863), which was at once successful. This was followed in 1865 by *The Village on the Cliff; To Esther, and Other Sketches; Old Kensington*, the work by which she is best known; *Blue Beard's Keys; Toilers and Spinners; Miss Angel* (1875); *Anne Evans* (1880); *Madame de Sévigné* (1881); *A Book of Sybils* (1883); *Mrs. Dymond* (1885); *Lord Tennyson and His Friends* (1893); *Lord Amherst and the British Advance Eastward to Burmah* (1894); and *Chapters from Some Unwritten Memoirs* (1895).

RITCHIE, ELIZA, educator, was born in Nova Scotia and was graduated from Dalhousie University, Halifax, with honors in 1887. She was a student at Cornell University for two years, and in 1890 was appointed to the professorship of psychology and history of philosophy in Wellesley College. W.F.J.

RITCHIE, THOMAS, journalist and politician; was born in Virginia in 1778. In 1804 he became editor of the *Enquirer*, at Richmond, Virginia, and thereafter devoted himself to journalism and political leadership with noteworthy success. For more than forty years he edited the *Enquirer* and made it one of the most influential Democratic papers in the country and one of the strongest advocates and exponents of State Rights. In 1845 he relinquished the *Enquirer* to his two sons and went to Washington at the request of President Polk to edit the *Union*. He returned to Richmond in 1849, and died on July 12, 1854. His son William was the husband of Anna Cora Mowatt Ritchie (q. v., supra). W.F.J.

RITCHIE, WILLIAM JOHNSTONE, SIR, jurist, was born in Nova Scotia on October 28, 1813, and was admitted to the bar in 1838. He had a distinguished career as puisne judge, chief justice of New Brunswick and of the Dominion, and deputy governor of the Dominion. He died on September 25, 1892. W.F.J.

RITES, CONGREGATION OF. See ROMAN CATHOLIC CHURCH, Vol. XX, p. 645.

RITSCHL, ALBRECHT, a German theologian; born in Berlin, March 25, 1822. He was educated at Bonn and Halle; became instructor in the University of Bonn in 1846, afterward was professor of theology there until 1864, when he was appointed to the same chair at Göttingen. He wrote many works on the Lutheran doctrines, as *The Christian Doctrine of Justification and Reconciliation* (1870–74); *History of Pietism* (1880); *Theology and Methaphysics* (1881); *Instruction in Christian Religion* (1875); and *Origin of the Ancient Catholic Church* (1850). Ritschl was the founder of a

school of theologians who reject the doctrine of the trinity, incarnation, original sin, and other orthodox beliefs, and hold that the religious sense is the essential and ultimate fact in religion. He died March 20, 1889.

RITTENHOUSE, Benjamin, inventor; was born in Pennsylvania about 1741. He was superintendent of the Pennsylvania arsenal in the Revolution, a member of the assembly of that state, and a county judge. He is most remembered as the inventor of the standard surveyor's chain used by the United States Land Office. He lived in Philadelphia most of his life, and died there in 1825. W.F.J.

RITTER, Heinrich, philosopher; was born in Germany in 1791 and devoted himself to the study of philosophy and its history. His works upon those subjects, published at intervals from 1817 to 1863, are standard authorities. He died in 1869. W.F.J.

RITTER, Frederic Louis, musician, was born at Strasburg, Alsace, on June 22, 1834, and came to America at the age of twenty-seven years. He settled in Cincinnati as a teacher and director of music. In 1862 he removed to New York, and for some years was conductor of the Arion Society and of the Sacred Harmony Society. In 1870 he became the head of the department of music at Vassar College, and filled that place for the rest of his life. The University of the State of New York made him a Doctor of Music in 1878. He was the author of *Lectures on Music*, *Practical Harmony*, *Student's History of Music*, *Manual of Musical History*, *Musical Diction*, *Music in America*, *Music in England*, etc., and was the compiler of *The Woman's College Hymnal*, and editor of *The Realm of Tones*. He was the composer of a great number of pieces of music, for the orchestra, organ, pianoforte, violin, and other instruments, and for the human voice. He died during a visit to Europe, at Antwerp, on July 6, 1891. W.F.J.

RITTER, William Emerson, scientist and educator, was born at Hampden, Wisconsin, in 1856, and was graduated from the University of California in 1888. He also studied at the Zoölogical Station at Naples, Italy, and at the University of Berlin. He is associate professor of zoölogy in the University of California, and president of the California Academy of Sciences. He has written many articles on zoölogy, biology, comparative anatomy, and other topics. W.F.J.

RITUALISTS, the name given to a school of theologians in the English Church who advocate the adoption, by the modern church, of a ritual more nearly like that of the Roman Catholic Church than the service now used. The school is a modern development of the High Church party which has been in existence in England since the Reformation, and which has always tried to preserve the catholicity of the church from innovations by the various more radically Protestant sects to which the Reformation gave birth. The movement proceeded immediately from the Tractarianism of the earlier part of the century, and owes its origin to the impetus which that movement gave to the study of early ecclesiastical history. It first manifested itself in the introduction of choral services similar to those of the Roman Catholic Church, later in a more strict adherence to the letter of the Church Prayer-Book, which prescribes a liturgy more similar to the Roman Catholic liturgy than that previously in vogue in the Anglican Church, and lastly in a revival of the ancient pre-Reformation rites of the English Church. The movement met with considerable opposition from the Low Church party, has been denounced as treasonable and Romanizing in its effects, and several of its leaders have been prosecuted, although, as a rule, without success. One of the most notable cases was the trial of the Bishop of Lincoln, who, however, obtained a practical victory over his opponents. Ritualism has spread from the mother church in England to its American offspring, the Protestant Episcopal Church of America, and has been the cause of considerable discussion, notably in the Baltimore General Convention of 1871.

RITUAL OF THE DEAD. Champollion and De Rougé gave this name to collections of prayers found in sarcophagi and in the tombs of ancient Egypt. They were written on parchment in hieroglyphics. In the Louvre and in other museums are preserved considerable portions. At an early date the belief in magic prompted the idea of composing little formularies for the use of the dead, and these were formed into a sort of manual, as a viaticum to preserve the departed against the evil geniuses of the tomb. The compilation became very large and received the title *Permhron*. There are sixty-five chapters. One copy, more or less complete, written on papyrus was placed near the mummy. Long extracts were copied upon the walls of the passage leading to the funeral chapel, as also on the sarcophagi. Certain priests culled sentences from all this medley and pretended to elucidate them according to tenets of their own schools. The priests of Thebes compiled thus the *Book of the Gates*, a manual, or guide, to infernal geography. There was a *Ritual of Embalming*, and the *Book of the Opening of the Mouth*, as well as other treatises. W.R.B.

RIVAS, a town of Nicaragua, and the capital of the department of the same name. It was the ancient town of Nicarao, and most of its inhabitants are Indians. Population, 1895, 3,800.

RIVERS. See Geology, Vol. X, pp. 241–247.

RIVERS, Pearl, pseudonym of Nicholson, Mrs. Eliza Jane; q. v., in these Supplements.

RIVER FALLS, Wisconsin, a city of Pierce County on the Kinnickinnick tributary of the Mississippi River, 30 miles east of St. Paul, Minnesota, on the Hudson and Ellsworth division of the Chicago, St. Paul, Minneapolis & Omaha railroad. A State Normal School is situated here. Milling industries promoted by abundant water power, and cereal, tuber, fruit, and wool products, with live cattle, supply an export trade. Population, 1890, 1,783; 1900, 2,008. C.L.S.

RIVERHEAD, Long Island, New York, the seat of Suffolk County, a town at the head of navigation on Peconic River, a short distance from its outlet in Great Peconic Bay, 74 miles by rail east of New York city. It has lumber, flour, pickling, canning and other industries. Population, 1890, 4,010; 1900, 4,503. C.L.S.

RIVERSIDE, California, the seat of Riverside County, a city on the Santa Ana River, and on divisions of the Southern California and the Southern Pacific Company railroads, 50 miles east of Los Angeles. It is a well built city with beautiful tree lined streets and avenues, Magnolia avenue being world famous. It is a citrous fruit-growing center, exporting enormous quantities of oranges, lemons, grapes, etc. Population, 1890, 4,683; 1900, 7,973. C.L.S.

RIVES, Amélie, the maiden name of a Virginian novelist, granddaughter of William Cabell Rives; was born in Richmond, Virginia, Aug. 23, 1863, and passed her girlhood near Charlottesville, Albemarle County, Virginia. At an early age she exhibited a passion for art and literature. Her first production was a series of stories entitled *A Brother to Dragons* (1888), which showed imagination and a sort of untutored strength. This was followed, in the same year, by *The Quick or The Dead?* which brought the author into prominence as a writer of sensational fiction, "with a tendency to ridiculous extravagance in the representation of passion." Her later writings include *Herod and Mariamne*, a tragedy in blank verse (1889); *The Witness of the Sun* (1889); *Virginia of Virginia* (1890); *According to St. John* (1891); *Barbara Dering* (1892); *Tanis* (1893); and *Athelwold* (1893). In 1888 she married John Armstrong Chanler, a descendant of the first J. J. Astor, but they were divorced for incompatibility, and in 1896 she married Pierre Troubetskoi, the son of a Russian prince.

AMÉLIE RIVES.

RIVES, George Lockhart, lawyer, was born in New York on May 1, 1849, and was graduated from Columbia College in 1868, and from Trinity College, Cambridge, England, in 1873. He was admitted to the bar in 1874, was corporation counsel of New York in 1902–03, and is a trustee of Columbia College, of the New York Public Library, and of other institutions. W.F.J.

RIVES, William Cabell, statesman; was born in Virginia on May 4, 1793, and was a political disciple of Jefferson. He served in the Virginia legislature, and in Congress in 1823–29. He was minister to France in 1829–32, and in 1849–53, and during most of the interval between the two terms was a United States Senator from Virginia. In 1861 he was a member of the Provisional Confederate Congress. He wrote a *Life of John Hampden* (1845); *Ethics of Christianity* (1855), and *Life and Times of James Madison* (1859–69). He died on April 26, 1868. W.F.J.

RIVIERA. See Italy, Vol. XIII, p. 446.

RIVIÈRE, Briton, an English painter; born Aug. 14, 1840, in London; educated at Oxford, and studied art at the same time, under his father, who was instructor in drawing there. In 1858 he exhibited, in the Academy gallery, *Sheep on the Cotswolds* and *On the Road to Gloucester Fair;* and after 1864 was a regular exhibitor in the Academy. He was elected associate in 1878; academician in 1881; and obtained medals at the Philadelphia and Paris expositions. His pictures are characterized by delicacy and refinement in drawing and color. Among them are *Genius Loci* (1876); *The Poacher's Widow*, in the Public Library, Birmingham; *Let Sleeping Dogs Lie* (1881); *Of a Fool and His Folly There is No End* (1889); *Daniel's Answer to the King* (1890); and *Rus in Urbe* (1890). His best picture, *Syria—The Night Watch*, is in the Walters Gallery, Baltimore.

RIVIERE DU LOUP, (Fraserville), Temiscouata County, Quebec, Canada, on the Intercolonial and the Temiscouata railroads. It is on the river St. Lawrence, 125 miles below Quebec, and is the seat of Fraserville Institute, a convent and an academy. The inhabitants are nearly all French. Population 1891, 4,175; 1901, 4,569.

RIVIÈRE DU LOUP (EN HAUT) or LOUISEVILLE, Canada, the seat of Maskinongé County, Quebec, on the north bank of the St. Lawrence, 50 miles by rail northeast of Montreal. Population, 1901, 1,655. C.L.S.

ROAD, The Law of the, a term of two meanings, referring, in the first place, to the laws governing the meeting or passing of persons or vehicles upon the highways, and secondly, to the rules governing the sailing, steering or navigation of vessels upon navigable waters when meeting or passing each other. The American law of the road as to vehicles is exactly the opposite of that described in the English epigram:

> "The law of the road is a paradox quite,
> In riding or driving along:
> If you go to the left, you are sure to go right,
> If you go to the right, you go wrong."

The American driver keeps to the right, the English to the left. As a general principle of law, when vehicles meet upon roads that cross, the one first reaching the intersection has the right of way, subject, invariably, to the proper and legitimate user of the highway by foot-passengers, for whose safety the driver of the vehicle is legally bound to observe caution.

In England, when one vehicle overtakes another, the latter gives way to the left, and the other passes on his right-hand side. The rules of the highroad, however, are all subject to the general principle of law that all persons traveling on the highway, whether riding, driving or walking, must use reasonable care and diligence to avoid collision.

In American cities, patrol-wagons of the police force, ambulances and fire-engines have the right of way, and are provided with warning-gongs. In England, fire-engines alone are thus favored.

The conveyance of the United States mails is protected and insured by Federal statutes, rendering it highly penal to obstruct their transport. These statutes confer a right of way upon mail carts and carriers. Lawful processions held under permit, the movement of state or Federal troops, and funeral *cortéges* also, have priority over ordinary traffic. Physicians are frequently given badges for the same purpose.

As to pedestrians, the rule of the road on both sides of the Atlantic is the same, to keep to the right. Under the provisions of the Highways and Locomotives Amendment Act, 1882, the quarter sessions in English counties, and the municipal authorities or local boards in towns and villages, have powers conferred upon them to pass by-laws regulating the use of bicycles and tricycles within their respective districts. Nearly every local authority passed similar by-laws which substantially provided for the carrying and sounding of a bell when overtaking any person or vehicle, the carrying of a lighted lamp after nightfall, moderation in speed, prohibition of racing, and reasonable rules for dismounting when restive horses are encountered. These by-laws are now enforced by the county councils. Similar municipal regulations are to be found in the principal cities and villages of America, and in each country the prohibition of riding upon the sidewalk is usual, and a violation is rendered penal.

The law or rule of the road at sea comprises the rules governing the navigation of vessels at sea, and the precautions required to avoid collisions. These matters, in the days of fast Atlantic vessels, and vast fleets of merchant vessels, have become questions of international regard and regulation. The tendency, the world over, is toward the adoption of a uniform system by all maritime countries. An International Maritime Conference met at Washington Oct. 16, 1889, for the purpose of discussing, revising and amending the rules, regulations and proceedings in relation to vessels at sea, and navigation generally. It remained in session until December 31st of the same year, and the report of its proceedings filled three large volumes. It recommended the adoption of a rule of the road at sea, corresponding closely to that which already existed. This rule was to go into effect March 1, 1895, and was generally adopted by Austria, France, Germany, the Netherlands, Portugal, Spain, Sweden and the United States. British objections, however, postponed the day of the universal international operation of the rule.

There are certain rules of navigation which have been adopted by the courts of all nations, and have the effect of positive law. They may be generally stated as follows: 1. When two sailing or steam vessels are approaching each other bow on, or nearly so, both helms must be put to port or left, so that each may pass on the port or left-hand side of the other; 2. When two sailing-vessels are crossing, and have the wind on different sides, the one with the wind on the starboard or right side shall have the right of way, unless she is sailing with the wind free, and the other is closehauled, in which case the vessel with the wind free must give way to the other; 3. As a steamboat is deemed as always sailing with a free and fair wind, and capable of better control than a sailing-vessel, the former must always keep out of the way of the latter; 4. Every vessel overhauling another must keep out of the way of the latter; 5. A vessel clearing out of a harbor must make way for another vessel that enters; 6. When two steam-vessels approach each other on such a course that a collision is possible, each shall slacken speed, and if necessary, stop and reverse, and in a fog, steam-vessels must go at a moderate speed; 7. The master of a vessel entering a port or river where other vessels are lying at anchor is bound to make use of all proper checks to stop the headway of his vessel, in order to prevent accidents.

Although the foregoing are "rules," adopted for the general guidance of masters of vessels, they are subordinate to the rule prescribed by common sense, which is, that every vessel shall keep clear of every other vessel when she has the power to do so, notwithstanding that such other vessel may have taken a course in violation of the rules of navigation. In no case would a master be justified in keeping his course after it became apparent that to do so would result in a collision, if by changing such course without injury a collision could be avoided.

All vessels are required to display lights at night, whether sailing-vessels or steamboats, and whether under way or at anchor. These lights, and their arrangements, are such that the observer can tell whether they are carried by a sailing or steam vessel; whether the vessel is under way or at anchor; and if under way, the course the vessel is steering. The rules regarding lights are as follows: 1. Seagoing steamers while under way must display at the foremast-head a bright white light, on the starboard side a green light, and on the port side a red one. The side lights must be so arranged with inboard screens that they cannot be seen across the vessel's bow. 2. Steamers having other vessels in tow must display two white lights at the masthead, instead of one. 3. Sailing-vessels must display green and red side lights described above, but none at the masthead. 4. All vessels at anchor, whether propelled by wind or steam, must display, not more than twenty feet above the hull, a white light in a globular lantern eight inches in diameter.

In fogs, whether by day or night, steam-vessels under way must sound a steam-whistle at intervals of not more than one minute; sailing-vessels under way must sound a fog-horn at intervals of not more than five minutes; and when at anchor, both steamers and sailing-vessels must ring a fog-bell at intervals of not not more than five minutes.

In maritime law, although the term *collision* is applied to all cases of vessels running foul, technically it only applies to the act of two vessels striking together; when one vessel strikes against another, it is called *allision*. In either case, the

injured parties have, under the general maritime law of all civilized nations, a claim against the offending vessel for any damage resulting. There may be a collision without actual contact, as where one vessel, by careless navigation, compels another to run ashore to escape greater peril. Collisions are usually classified as follows: 1. Those which occur without blame attaching to either vessel; as where the injury is occasioned by a storm. In such cases the misfortune must be borne by the party on whom it happens to light, the other not being responsible to him in any degree. 2. Those which arise where both vessels are at fault—where there has been a want of due diligence or of skill on both sides. In such cases, the law apportions the resulting damage between them, both having contributed to the injury. 3. Those in which the injured vessel is free from blame, and the collision is the result of negligence or violation of the rules of navigation by the other. In this class of cases, the offending vessel must respond in damages for all losses sustained. See also NAVIGATION, Vol. XVII, p. 285.

ROADS. See ROADS AND STREETS, Vol. XX, pp. 597–604; and HIGHWAYS, Vol. XI, pp. 724–725.

ROADS, MOVEMENT FOR GOOD, IN THE UNITED STATES. The entire subject of road-making has been well and fully dealt with under ROADS AND STREETS, Vol. XX, pp. 597–604, though, in the main, the article deals with the roads of England and Europe. America's first roads were mere Indian trails, which skirted the watercourses, and crossed mountain ranges by convenient gaps. When the Pilgrims came to New England the towns took control of roads, and many an old New England record mentions roads, eight and ten rods wide, authorized by law, and of which but a portion was devoted to traffic.

The eighteenth century saw the introduction of turnpikes, many constructed and maintained by private companies, which were allowed to collect toll. These turnpike roads were probably the first instances of the use of gravel or broken stone for surface material. Congress, in 1796, authorized the construction of a national road from Baltimore westward. It ran for 650 miles, through Pennsylvania, Ohio and Illinois; its width was eighty feet, thirty of which consisted of broken stone. With the advent of the steam-railroad it fell into a bad state of repair, but is still known as a good, well-graded road.

The introduction of the bicycle in the United States soon crystallized public opinion in regard to the necessity of good roads. In 1885 an extensive agitation began, mainly produced by the efforts of Colonel Pope and the bicycle-riders of the country, and which produced very excellent results. The movement spurred county commissioners, township municipalities and selectmen, and borough counties to improve existing and construct fresh roads. The efforts of the League of American Wheelmen (q.v., in these Supplements) have been extensively directed toward the improvement of the American roads, and many public-spirited men have endeavored to convince the farmer-taxpayer of the inevitable saving which will ensue from the improvement of all local roads. In 1892, and as a result of such agitation, the state of New York spent over two and a half million dollars in road-improvements in fifty counties, and repeated instances of amended highway legislation have occurred in the various state legislatures.

Literature has aided the effort, and an excellent work from the pen of N. S. Shaler, dean of the Lawrence Scientific School of Harvard University, appeared in 1896, under the title *American Highways: A Popular Account of their Conditions and of the Means by Which They may be Bettered.* It dealt with the subject of improved highroads from historical and existing aspects, contained much practical matter as to road-construction and cost, and included a useful bibliographical list of important works on the subject of highway-construction.

ROANOKE, a city of Roanoke County, southwestern Virginia, on the Roanoke River, 258 miles by rail W. of Norfolk, at the junction of the Shenandoah Valley and the Norfolk and Western railroad. It has extensive machinery, iron and steel works, locomotive and car shops, and a tobacco factory. It is in an iron-mining, tobacco-growing and live-stock section, and has a very good general trade. There are mineral springs of great medical value in the vicinity. Population 1890, 16,159; 1900, 21,495.

ROANOKE COLLEGE, a non-sectarian institution of learning, founded in 1853, and situated in Salem, Virginia. The college offers a four years' course, which is partially elective. The grounds of the institution embrace twenty acres, and there are four buildings, one of which is a library containing 22,000 volumes. In 1900–01, there were 195 students in attendance; the number of instructors, 10. The total productive funds of the college amount to $65,000, and its annual income, $15,000.

ROANOKE RIVER, Virginia and North Carolina, flows into Albemarle Sound below Plymouth, in Washington County, N. C., after a southeasterly course of 260 miles from the junction at Clarksville, Va., of its Alleghany headstreams, the Dan and Staunton. It is navigable for vessels 75 miles to Halifax at the great falls, around which a canal opens navigation for smaller boats. C.L.S.

ROATAN, an island. See HONDURAS, Vol. XII, p. 133.

ROBBERY. See THEFT, Vol. XXIII, p. 250.

ROBERT II AND III, Scottish kings. See SCOTLAND, Vol. XXI, pp. 512, 513.

ROBERT COLLEGE, an American institution of learning in Constantinople, Turkey. It was founded and has been maintained largely by the gifts of Christopher R. Robert of New York, who, upon his death in 1878, left a bequest of one fifth of his estate to the institution. His total benefactions to it amount to nearly half a million dollars. The college was chartered under the laws of New York state as one of the colleges of the University

of New York, and was opened in a rented building in 1863, Rev. Cyrus Hamlin becoming its first president. Since its establishment, 1,715 students have attended the college, of which 274 have graduated.

ROBERT–FLEURY, the name of two French painters, father and son. Joseph Nicolas, the father, was born in Cologne, Aug. 8, 1797. He studied art in Paris. Among his best known works are *Massacre of St. Bartholomew; Conference at Poissy in 1561;* and *Jane Shore*, —all of which are in the Luxembourg; *The Entrance of Clovis into Tours*, at Versailles; and *The Institutions of the Juges Consuls; The Promulgation of the Ordinance of Commerce*, and others, in the new palace of the Tribunal of Commerce. He died in Paris, May 4, 1890.—Tony, born in Paris, Sept. 1, 1837; studied under Delaroche; exhibited in the Salon of 1866, where his *Varsovie, April 8, 1861*, representing a massacre in the Polish War of Independence, was awarded a medal. He was given the decoration of the Legion of Honor. Among his works are *Old Women of the Place Navona, Rome*, and *The Last Day of Corinth*, both in the Luxembourg; *Charlotte Corday at Caen; Portrait of M. Robert-Fleury* and *The Billet-Doux* (1891).

ROBERTS, Ellis Henry, was born at Utica, New York, on September 30, 1827. From 1851 to 1880 he was editor and proprietor of the Utica *Morning Herald;* was a representative in Congress in 1871–75; assistant treasurer of the United States at New York in 1889–93, and from 1897 to 1905 was treasurer of the United States.

W.F.J.

ROBERTS, Frederick Sleigh Roberts, Lord, English soldier, son of Sir Abraham Roberts; born at Cawnpore, India, Sept. 30, 1832; appointed lieutenant in the Bengal artillery in 1851; captain in 1860; served with distinction in the Indian Mutiny, and received the Victoria Cross; took part in the Abyssinian war in 1868 as assistant quartermaster-general, and became brevet lieutenant-colonel; in 1875 he was quartermaster-general in India, with the local rank of major-general. In the Afghan war of 1878 he commanded the column sent to operate through the Kuram valley, and, surmounting the difficulties of the Peiwar Pass, gained a brilliant victory at Charasiab and entered Kabul. On the investure of Kandahar by Ayoub Khan he rapidly performed the march from Kabul to Kandahar, one of the most brilliant military feats of modern times, and utterly defeated the pretender, Sept. 1, 1880. For these services he was created a baronet in 1881. In 1885–93 he was successor to Sir Donald Stewart in the command of the Indian army. Lord Roberts's popularity with the troops was remarkable. Familiarly known by the soldiers' sobriquet of "Little Bobs" or "Bobs Bahadur," he figures in more than one of Kipling's virile military poems. In 1892 he was raised to the peerage, and in 1895 was made Field Marshal and Commander of the Forces in Ireland. As the foremost general in the British army, and one endeared not only to the English nation but to every soldier in the ranks, he was naturally thought of by the English government for the commandership-in-chief of the British forces in South Africa in Dec. 1899, when it was determined to supersede General Sir Redvers Buller, who had met with serious reverses on the Tugela River, Natal. The acceptance of the post by Lord Roberts brought a sincere feeling of relief to the English people, and he took with him to the Cape General Lord Kitchener as head of the staff. The touch of pathos was given to the ready response of the veteran general to the government call when we consider not only Lord Roberts's advanced years, but the fact that he had just lost his only son while heroically endeavoring to save the British field batteries at Colenso "under a hurricane of leaden hail." On his arrival in South Africa, with large additions to the field force, the turning point was reached in the war, and the invasion was at once and successfully pressed into the Orange Free State and subsequently into the Transvaal. With new vigor and fresh blood, the fruits were soon seen in the relief of invested towns, in the surrounding and capture of Cronje's command, and in the ultimate annexation of the two hostile Boer republics, with the surrender or flight of the burghers, including the decamping of President Kruger and the practical close of the war. As we write these lines (Jan., 1901), Lord Roberts has resigned the chief command in South Africa and returned to reap a well earned rest in England, with the honors and applause of his Queen and Country. Lord Roberts, who has been made an Earl and a Knight of the Garter, in 1895 published a work entited *The Rise of Wellington*, and in 1897 there came from his vigorous pen *Forty-One Years in India*.

LORD ROBERTS.

G. M. A.

ROBERTS, Howard, sculptor; was born in Philadelphia in 1842, and studied at the Philadelphia Academy of Fine Arts and in Paris. In the latter city he executed several pieces of statuary, one of which, *The First Posing*, won a medal at the Philadelphia world's fair of 1876. He excelled in the making of ideal busts of women and children, and his *Hypatia; Lucile; Hester Prynne and Little Pearl*, and *Lot's Wife* have been much admired. He died in 1900. W.F.J.

ROBERTSON, George Croom, a Scotch educator; born in Aberdeen, March 10, 1842. He was successively philosophical examiner in the Universities of London and of Aberdeen (1878–81); and in the University of Cambridge (1877–78). He was the editor of the journal *Mind* (1876–91); was the author of *Hobbes*, in Blackwood's Philosophical Classics (1887); contributed to the *Dictionary of National Biography*, and to this Encyclopædia several articles, among them Abelard, Analogy, and Analysis. Died Sept. 21, 1892.

ROBIN, Charles Philippe, a French physician

and naturalist; born at Jasseron, department of Ain, June 4, 1821. He studied medicine in Paris. In 1847 he was made assistant professor of natural sciences on the Faculty of Medicine in Paris, and in 1862 professor of histology. He became celebrated for his microscopical researches in physiology. In 1864 he founded a journal on anatomy and physiology; in 1865 edited Nysten's *Encyclopædic Dictionary of Medicine*, and published *Cellular Anatomy and Physiology* (1873) and *A New Abridged Dictionary of Medicine* (1886). He died in Paris, Oct. 6, 1885.

ROBIN GOODFELLOW. See ROBIN HOOD, Vol. XX, p 621.

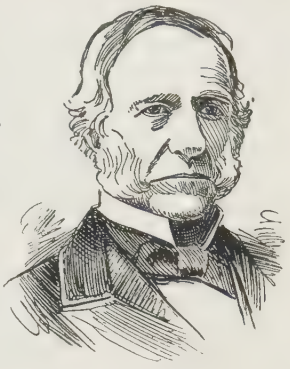
ROBINS, ELIZABETH, American actress and novelist; born in Louisville, Ky., in 1862; in 1885 married George R. Parke of Boston, who died in 1886. In 1891 and later she appeared with success in London in some of Ibsen's plays. Under the pen-name C. E. RAIMOND she has written *George Mandeville's Husband* (1894); *The New Moon* (1895); *Below the Salt* (1896); and *The Open Question* (1898).

ROBINSON, Illinois, the seat of Crawford County, a city 40 miles by rail southwest of Terre Haute, Ind., with a trade in farming and stock produce. Population, 1900, 1,683. C.L.S.

ROBINSON, BEVERLY, an American loyalist; born in Virginia in 1723. He served as major under Wolfe at Quebec, and acquired considerable wealth through his marriage with the daughter of Frederick Phillipse, the owner of a large estate on the Hudson. Though he opposed the acts of the British government which led to the Revolution, he espoused the British cause when war was declared, and, going to New York, raised the Loyal American Regiment, of which he was colonel. His country house was the headquarters of Arnold while arranging his treason. At the close of the Revolutionary war Robinson went to England with a part of his family, and died in Thornbury, England, in 1792. E.E.T.

ROBINSON, CHARLES SEYMOUR, clergyman and author, was born at Bennington, Vermont, on March 31, 1829, and was graduated from Williams College in 1849. He taught school, and in 1855 became pastor of a Presbyterian Church at Troy, N. Y. He was pastor of a church in Brooklyn, N. Y., in 1860–68, of the American chapel in Paris, France, in 1869–70, of the Memorial Presbyterian Church, New York, in 1871–87, of the Thirteenth St. Church, New York, in 1891, and of the New York Presbyterian Church, in New York, in 1892–98. Meantime he edited *The Illustrated Christian Weekly*, *Every Thursday*, and *The Christian at Work*. He published *Songs of the Church*, *Songs for the Sanctuary*, and other collections to which he contributed some original work of high character. He was also the author of other books which have had wide circulation. He died in New York on February 1, 1899. W.F.J.

ROBINSON, EZEKIEL GILMAN, educator; was born at Attleborough, Massachusetts, on March 25, 1815, and was graduated with honors from Brown University, Providence, R. I., in 1838. After studying at the Newton Theological Seminary he entered the ministry of the Baptist Church at Norfolk, Virginia, and served there for three years, being for a time chaplain of the University of Virginia. Thereafter he was a pastor at Cambridge, Massachusetts, professor of Hebrew at Covington, Kentucky, pastor in Cincinnati, Ohio, professor and president of the Rochester, New York, Theological Seminary, and in 1872 president of Brown University, also filling the chair of moral philosophy and metaphysics. His administration was highly successful, being marked with the building of the new library, the Slater Hall Dormitory, and the Sayles Memorial Hall, and the increase of the university's funds from $550,000 to more than $1,000,000. In 1889 he resigned the presidency of Brown, and afterward was a lecturer at Crozer Theological Seminary. He was the author of a number of theological works. He died on June 13, 1894. W.F.J.



E. G. ROBINSON.

ROBINSON, SIR FREDERICK PHILLIPSE, soldier; son of Beverly Robinson (q.v., supra), was born in New York in 1763, and in his boyhood followed his father into the ranks of the British army. He was among those captured by Wayne at Stony Point, and, upon being released through exchange, quitted the country and went to England. He afterward served in the West Indies and under Wellington in Portugal and Spain. In the War of 1812 he was in command of the British army in Ontario, and in 1815 was made governor of that province and was knighted. Later he was commander-in-chief in the West Indies, a lieutenant-general in 1825 and general in 1841. He died on January 1, 1852. W.F.J.

ROBINSON, SIR HERCULES GEORGE, afterward LORD ROSMEAD, diplomat and administrator; was born in England on December 19, 1824, and was educated at Sandhurst. He was president of the council in Montserrat in 1854, lieutenant-governor of St. Kitts in 1855, governor of Hong Kong in 1859, governor of Ceylon in 1865, governor of New South Wales in 1872, governor of New Zealand in 1878, and governor of Cape Colony in 1880, and again in in 1895. He annexed the Fiji Islands to the British Empire in 1874. He was made a Knight of St. Michael and St. George in 1875, a baronet in 1890, and a peer, as Baron Rosmead, in 1896. He died on October 28, 1897. W.F.J.

ROBINSON, PHILIP STEWART, author and journalist; was born of English parents at Chunar, India, in 1849, and was educated at Marlborough College. He became assistant to his father, the editor of the *Pioneer* at Allahabad, India, and filled two college professorships. He was a correspondent of the London *Daily Telegraph* in

the Afghan War of 1878 and the Egyptian War of 1882, and afterward was a correspondent of the New York *World* and the *Pall Mall Gazette*. His books include *In My Indian Garden* (1878); *Under the Punkah* (1881); *Noah's Ark* (1882); *The Poet's Birds* (1883); *Sinners and Saints* (1883); *Chasing a Fortune* (1885); *The Poet's Beasts* (1885); *Tigers at Large* (1885); *The Valley of Teétotum Trees* (1886); *Some Country Sights and Sounds* (1893); *Birds of the Wave and Woodland* (1894), and *In Garden, Orchard and Spinney* (1897). W.F.J.

ROBINSON, Stuart, theologian; was born in Ireland on November 26, 1816, was educated at Amherst College, and at Princeton Theological Seminary, was ordained into the Presbyterian ministry in 1841, and became a preacher and teacher in Virginia and Kentucky. In the Civil War he came into conflict with the United States Government, and his paper, the *True Presbyterian*, was suppressed for treason. He thereupon went to Canada, where he preached and published a book in championship of slavery as a divinely appointed institution. Returning to Kentucky after the war, he continued his advocacy of the "Lost Cause," with the result that he was expelled from the local Presbytery and from the General Assembly of the Presbyterian Church. He thereupon identified himself with the Southern General Assembly. He died on October 5, 1881. W.F.J.

ROBINSON, Therese Albertina Louise (von Jakob), a German-American authoress; born in Halle, Jan. 26, 1797. For nine years she resided in Russia with her father, and upon her return published translations into German of Sir Walter Scott's *Old Mortality* and *Black Dwarf*. In 1828 she married Professor Edward Robinson (q.v., Vol. XX, p. 622), and went with him to America. Here she contributed to the *North American Review* and the *Biblical Repository*, the latter of which her husband edited. After her husband's death Mrs. Robinson lived in Hamburg, Germany. She published books in both German and English, under the pseudonym Talvj, an anagram of the initals in her maiden name. Among her works in German are *Volkslieder der Serben* (1826); *Die Unechtheit der Lieder Ossians* (1840); and *Die Colonisation von New England* (1847); among those in English, *Woodhill: or, the Ways of Providence* (1856); *Historical View of the Language and Literature of the Slavic Nations* (1850); and a posthumous work, entitled *Fifteen Years* (1870). She died in Hamburg, April 13, 1869.

ROBINSON CRUSOE. See Defoe, Vol. VII, p. 24.

ROB ROY, the pseudonym of MacGregor, John, (q.v., in these Supplements.)

ROBSON, Stuart, actor; was born at Annapolis, Maryland, on March 4, 1836, and went upon the stage in 1852. He became a member of Laura Keene's company, was afterward a member of A. M. Palmer's company, and was a partner of William H. Crane in many productions. He died on April 29, 1903. W.F.J.

ROBY, Henry John, educator; was born at Tamworth, England, on August 12, 1830, and was educated at St. John's College, Cambridge, where he became a fellow in 1854. He has been a lecturer at Cambridge; under-master of Dulwich College; professor of jurisprudence at University College, London, and a commissioner of endowed schools. He was for many years a cotton manufacturer, and in 1890–95 a Gladstonian member of Parliament. He is the author of *Remarks on College Reform; Grammar of the Latin Language; Introduction to Justinian's Digest*, and *Roman Private Law in the Times of Cicero and the Antonines*. He is an honorary LL. D. of Cambridge and Edinburgh. W.F.J.

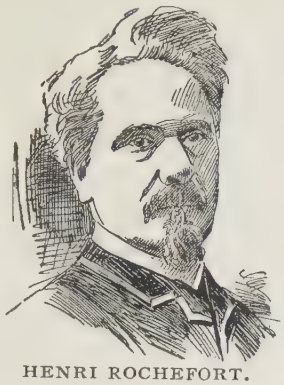
ROCAMBOLE. See Horticulture, Vol. XII, pp. 299, 300.

ROCHAMBEAU, Jean Baptiste Donatien de Vimeure, Count of, a French general; born in Vendôme, July 1, 1725. He was educated for the priesthood, but, upon the death of his elder brother, entered the army in 1742. In 1749 he succeeded his father as governor of Vendôme, and served in the Seven Years' War, attaining the rank of brigadier. In 1780 he was made lieutenant-general, and put in command of the French troops sent to aid the American Revolutionists. He landed in Rhode Island and established his headquarters at Newport. In June, 1781, he marched toward the Hudson, defeated a detachment of Clinton's army on Manhattan Island, joined Washington's army and took part in the siege of Yorktown. After the close of the war he returned to France; was a deputy to the Assembly of Notables in 1788; repressed the riots in Alsace in 1790, and was created field-marshal in the following year; commanded the Army of the North, but resigned in 1792; was imprisoned in 1793; and owed his life to the fall of Robespierre. In 1804 he was created grand officer of the Legion of Honor. He died May 10, 1807. His *Memoirs*, written at his dictation, were published in 1809 in Paris, and translated into English by William E. Wright in 1838.

ROCHE, James Jeffrey, an American journalist; born in Mountmellick, Ireland, May 31, 1847. He went to Prince Edward's Island in infancy, and was educated at St. Dunstan's College, Charlottetown. He engaged in commercial pursuits in Boston from 1866 to 1883, and was assistant editor of *The Pilot* from 1883 to 1890, under John Boyle O'Reilly, on whose death he succeeded to the editorship of the paper. He was appointed a member of the Boston Metropolitan Park Commission in 1893. He is the author of *Songs and Satires* (1886); *Life of John Boyle O'Reilly* (1891); *The Story of the Filibusters* (1891); *Ballads of Blue Water* (1895); *Her Majesty the King* (1898); *By-Ways of War*; etc. E.E.T.

ROCHEFORT, Victor Henri, Count of Rochefort-Lucay, journalist and political agitator; was born in Paris on July 29, 1832, a member of an ennobled family, from which he dissociated himself, preferring to pose as "one of the people." He became a clerk under the mu-

nicipal government, but was dismissed for indolence and neglect of duties. Thereupon he began political agitations against the government. In 1868 he founded and edited *La Lanterne*, a seditious paper of sensational tone, which was soon suppressed by the police, and he fled to Brussels to avoid arrest. In 1869, however, he returned, having been elected to the Chamber of Deputies, and started *Le Marseillaise*, in which he renewed his attacks upon the Imperial government, though with more dignity than before. Upon the cowardly and brutal murder of one of his staff, Victor Noir, by Prince Pierre Bonaparte, however, he was so outspoken that he was imprisoned and the paper was suppressed. Upon the fall of the empire in 1870 he came to the fore, and in 1871 was elected to the National Assembly. There he made himself the Communist leader, and he published *Le Mot d' Ordre* as a Communist journal. Upon the fall of the Commune he tried to flee, but was intercepted by the Germans and handed over to the French Government, which exiled him to New Caledonia for life. He escaped in 1874, and returned to France after the amnesty of 1880. He showed himself, however, as irreconcilable and as impracticable as ever, and in his new paper, *L' Intransigeant*, was rabidly bitter against the Republican government. He was a member of the Chamber of Deputies in 1885–86, and might have commanded some leadership there, with his undoubted abilities; but instead he threw himself away in the sordid and pinchbeck Boulanger conspiracy. Upon the collapse of that wretched affair he fled to England to find asylum, but was permitted to return to France in 1895, his influence and his power for harm to the republic being quite destroyed. He has written a highly entertaining book, entitled *The Adventures of My Life*, which was translated into English in 1896. Despite his eccentricities and frequent brutalities, he is a man of artistic tastes and of high talent as a writer and as a connoisseur of art, and has the personal traits of the aristocrats whom he affects to despise. W.F.J.



HENRI ROCHEFORT.

ROCHELLE, a city of Ogle County, northwestern Illinois, 73 miles W. of Chicago and 25 miles S. of Rockford, on the Chicago and North-Western and the Chicago, Burlington and Quincy railroads. It manufactures disk harrows, tile and bricks, barbed wire and oatmeal. The surrounding country is devoted to farming. Population, 1900, 2,073.

ROCHESTER, Minnesota, the seat of Olmsted County, a city on the Zumbro River, and a junction for divisions of the Chicago and Northwestern and the Winona and Western railroads, 90 miles south of St. Paul. It has many fine buildings, including the Roman Catholic Academy of Notre Dame de Lourdes. Farming and cattle-raising supply an active export trade in grain, wool and horses; other products include those of mills and factories, with an output of flour, clothing, machinery, etc. Population, 1890, 5,321; 1900, 6,843. C.L.S.

ROCHESTER, Indiana, the seat of Fulton County, a town in the valley of the Tippecanoe River, 95 miles north of Indianapolis, on the Chicago and Erie, and the Lake Erie and Western railroads. It is in a farming section, exporting its produce and having some manufactures. Population, 1900, 3,421. C.L.S.

ROCHESTER, New Hampshire, a manufacturing city and railway junction of Strafford County on four divisions of the Boston and Maine railroad, 78 miles north of Boston, Mass. The Cocheco River and Salmon Falls supply power to numerous mills and factories producing woolens, leather, shoes, machinery, bricks, etc. Population, 1890, 7,396; 1900, 8,466. C.L.S.

ROCHESTER, a city of New York, is on the New York Central and Hudson River, the Rochester division of the Erie, the Northern Central, the Buffalo, Rochester and Pittsburg and other railroads.

Rochester has 2,616 manufacturing establishments, employing 36,687 people. The value of its manufactured products per annum is $69,129,820. The capital invested in manufacturing and the wholesale trade amounts to $49,086,212. For many years Rochester's development was slow, but during the last two decades the city took a tremendous stride forward. The manufacture of men's clothing is its chief industry. There has been a rapid extension of the limits of the manufacturing district, and the establishment of large factories in places remote from the river-banks. East Rochester has developed into a thriving manufacturing section, with a number of large plants. Some of Rochester's finest public buildings are the courthouse, city hall and Free Academy, in the heart of the town; the Government Building and the State Arsenal, with the Soldiers' Monument in front of it, the Lyceum Theater and the Eureka Club-house.

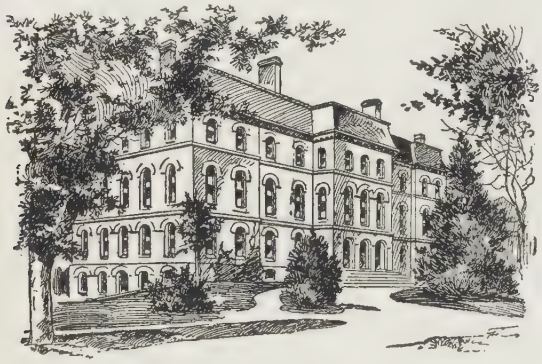
The general improvement of the city has of late years been very marked. The artistic side of life has not been neglected, and while, like many comparatively new cities, the streets of Rochester are noticeably bare of statuary, in the Powers Art Gallery a really valuable selection of paintings and *objets d'art* has been gathered. The collection is valued at upward of one million dollars. The number of paintings in the collection is nearly one thousand, while numerous superb examples of statuary, with expensive bric-à-brac and rare vases, add to the attractions of the gallery.

The assessed valuation of Rochester in 1900 was: Real estate, $106,847,720; personal estate, $9,100,430, bonded indebtedness, $10,366,578; civic expenditure, $2,542,170, education, $654,450. Pop. 1900, 162,435. See ROCHESTER, Vol. XX, p. 629.

ROCHESTER, Pennsylvania, a town of Beaver County, at the junction of the Beaver River with the Ohio, 26 miles northwest of Pitts-

burg, on the Pennsylvania lines. It has gas and oil wells, coal mines, and various manufactures. Population, 1890, 3,649; 1900, 4,688. C.L.S.

ROCHESTER UNIVERSITY is a Baptist institution. It opened for students in 1850 and instructed seventy-one men, graduating ten in 1851, in which year the charter was granted. It occupies grounds of 20 acres, forming a beautiful park. Anderson Hall, containing chapel, lecture-rooms and laboratories, Sibley Hall, with the library and museums, the Reynolds Memorial Laboratory, are the chief buildings. The Alumni



ANDERSON HALL, UNIVERSITY OF ROCHESTER.

gymnasium is well equipped. Candidates are examined in classics, science and history. There are three courses, the classical, the scientific and the philosophical; comprising rhetoric, elocution, English, Greek, Latin, Sanskrit, French, German, Spanish, Italian, mathematics, science, politics, philosophy, art and Biblical literature. There are also courses for the degree of M.A. Since 1900 women have been admitted on the same conditions as men. There are many scholarships, some for women. Expenses $236 per annum. W.R.B.

ROCHET, LOUIS, a French sculptor; born Aug. 24, 1813, in Paris. He studied under Pierre Jean David, and began to exhibit in 1835. His works include *Compte Ugolino et ses Enfants; Jeune Femme Pleurant; Napoléon Bonaparte;* the large equestrian statue of *Dom Pedro I,* erected at Rio de Janeiro in 1862; the statue of *Marshal Drouet* in the Versailles Museum; and of *Madame de Sévigné.* He died Jan. 21, 1878.

J. D. ROCKEFELLER.

ROCK-CHUTE SYSTEM. See COAL, in these Supplements.

ROCK-CRYSTAL. See MINERALOGY, Vol. XVI, p. 405.

ROCKEFELLER, JOHN DAVIDSON, an American capitalist; born in Richford, Tioga County, New York, July 8, 1839. At an early age he removed with his parents to Cleveland, Ohio; was educated in its public schools, and later employed by the firm of Hewitt and Tuttle in that city until he was 19, when he entered business on his own account. He evinced great aptitude for affairs, and from very small beginnings soon began to get rich. In 1860, when petroleum discoveries created the "oil fever," he was proprietor of a refinery in Cleveland with a modest capital. His business developed until he became president of the Standard Oil Company, a monopolistic corporation formed in 1870, through which he became enormously rich. In 1889 he reconstructed Chicago University, and gave it various amounts till the institution's endowment was $5,500,000. He also gave liberally to other public and religious objects.

ROCKET OR HESPERIS. See HORTICULTURE, Vol. XII, p. 258.

ROCK FALLS, Illinois, a city of Whiteside County on the Rock River, and on the Chicago, Burlington & Quincy railroad, 110 miles west of Chicago. The river and falls provide abundant water power for flouring and paper mills, foundries, agricultural implement and tool factories. Population, 1900, 2,176. C.L.S.

ROCK-FISH OR ROCK, the *Roccus lineatus,* a fish abundant in northern United States. In New York it is called striped bass because of the longitudinal dark-colored bands on the sides of the body. It is essentially marine, but it ascends rivers sometimes to perfectly fresh water. It is one of the finest food-fishes. On the California coast the name is inappropriately given to two species of *Sebastes,* which are very abundant, and excellent food-fishes. See also CALIFORNIA, Vol. IV, p. 623.

ROCKFORD, a city and the capital of Winnebago County, in the state of Illinois. The census of 1900 showed the following: 450 manufacturing establishments, with a combined capital of $14,126,834, employing 7,076 persons, paying $3,188,256 for wages and $6,659,240 for materials, having their products valued at $12,586,116. The manufacture of agricultural implements, furniture, and hosiery and knit goods are the chief industries. Population 1890, 23,584; 1900, 31,051. See also ROCKFORD, Vol. XX, p. 631.

ROCKHAMPTON, a seaport city of Queensland. Vessels of 1,500 tons come up to the wharves, while larger ships land at Port Alma, 36 miles below. The surrounding country has gold, silver and copper. Peak Downs and Mount Morgan are the two most important workings. Population 1901, 19,691. See also ROCKHAMPTON, Vol. XX, p. 631.

ROCKHILL, WILLIAM WOODVILLE, diplomat; was born in Philadelphia, Pennsylvania, in 1854. He was second secretary of the American Legation at Peking in 1884, first secretary in 1885, and *chargé de affaires* in Corea in 1886–89, made two journeys of exploration in China, Mongolia and Tibet in 1888–92, was chief-clerk of the state department in 1893–94, third Assistant-Secretary of State in 1894–95, first Assistant-Secretary of State in 1896–97, minister to Greece, Roumania and Servia in 1897–99, commissioner to China in 1900, plenipotentiary to the Congress of Peking in 1901, director of the Bureau of American Republics in 1899–1905, and in March, 1905, was appointed minister to China. W.F.J.

ROCKINGHAM, a village and the capital of Richmond Co., southwestern North Carolina, 83

miles S.W. of Raleigh, on the Seaboard Air Line and the Richmond and Danville railroads. It has an academy and a cotton-mill. Population 1900, 1,507.

ROCKINGHAM, a town and capital of Windham County, southeastern Vermont, on the Williams River, and 29 miles S. of Woodstock, on the Central Vermont railroad. It contains three paper-mills and two woolen-mills; also a cotton-mill. Pop. (including Bellows Falls), 1900, 5,809.

ROCK ISLAND, a city and the capital of Rock Island County, northwestern Illinois, on the Chicago, Burlington and Quincy, the Chicago, Rock Island and Pacific and the Rock Island and Peoria railroads. It has manufactures of agricultural implements, window-glass and cotton goods. Augustana College (Lutheran), located here, is a co-educational institution, founded in 1860, and had, in 1901, 33 instructors, 619 students, and a library containing 18,000 volumes. Pop. 1890, 13,634; 1900 (12th census), 19,493. See ROCK ISLAND, Vol. XX, p. 631.

ROCKLAND, Maine, the seat of Knox County, a seaport city on the west shore of Penobscot Bay and on the Maine Central railroad 90 miles northeast of Portland. It is an important transit station for numerous coastwise steamers. See ROCKLAND, Vol. XX, p. 631. Population, 1890, 8,174; 1900, 8,150. C.L.S.

ROCKLAND, Massachusetts, a town of Plymouth County, 18 miles southeast of Boston, on the North Abington and Hanover division of the New York, New Haven & Hartford railroad. It is a manufacturing center, chiefly of shoes. Population, 1890, 5,206; 1900, 5,327. C.L.S.

ROCKPORT, a village and the capital of Spencer County, southwestern Indiana, 28 miles E. of Evansville, on the Louisville, Evansville and St. Louis railroad. It has basket, chair and furniture factories; also flour and lumber mills. Extensive coal-mines are here. The village is surrounded by the most extensive tobacco-growing district of the state. Population 1890, 2,314; 1900, 2,882.

ROCKPORT, Massachusetts, a seaport town and summer resort on Cape Ann, in Essex County, at the head of Pigeon Cove Bay, and the terminus of a branch line of the Boston and Maine railroad, 32 miles northeast of Boston. It has large shipping, fishing, granite, quarrying and manufacturing industries. Population, 1890, 4,087; 1900, 4,592. C.L.S.

ROCKPORT, Texas, the seat of Aransas County, a seaport town on Aransas Bay, an inlet of the Gulf of Mexico, 170 miles southwest of Galveston, on the San Antonio and Aransas Pass railroad. It trades in market produce, game and fish. Population, 1900, 1,153. C.L.S.

ROCK RAPIDS, a village and the capital of Lyon County, in northwestern Iowa, 56 miles N.W. of Cherokee, on the Burlington, Cedar Rapids and Northern and the Chicago, St. Paul, Minneapolis and Omaha railroads. This place is situated in a farming district, and has flour-mills and grain-elevators. Population 1890, 1,394; 1900, 1,766.

ROCK ROSE, a name given in general to species of the family *Cistaceæ*, but particularly to the showy *Cistus ladaniferus* of Europe. The American representatives are species of *Helianthemum* (frostweeds), *Hudsonia* and *Lechea* (pinweeds), all of sandy woods and fields.

ROCKS. See GEOLOGY, Vol. X, pp. 204–214.

ROCK-SNAKE. See PYTHON, Vol. XX, p. 150.

ROCK SPRINGS, a town of Sweetwater County, in southwestern Wyoming, on Bitter Creek, and on the Union Pacific railroad. This place is known principally as a coal-mining region, there being here several beds of good lignite 9 to 14 feet thick. The various mines employ over twenty-five hundred men. Population 1890, 3,406; 1900, 4,363.

ROCKSTRO, WILLIAM SMYTH, an English pianist, musical composer, author and teacher; born in 1830. He arranged and edited various classical operas and was known as a voluminous composer of salon pieces, such as *Christabel*, and others. His other works include *Abbey Lands: A Tale* (1857); *The Choristers of St. Mary's* (1858); *A History of Music* (1879); *Practical Harmony for Students* (1879); *The Life of George Frederick Handel* (1883); *Mendelssohn* (1883); *A General History of Music from the Infancy of the Greek Drama to the Present Period* (1886). He wrote many articles for this ENCYCLOPÆDIA, including MENDELSSOHN, MOZART, PLAIN SONG, WAGNER, RICHARD WEBER, etc.

ROCKVILLE, a city of Tolland County, northern Connecticut, 12 miles W. of Tolland and 22 miles E.N.E. of Hartford, on the Central Vermont railroad. The more important industries are paper, woolen, silk and cotton mills. Population 1900, 7,287.

ROCKVILLE, a village and the capital of Park County, western Indiana, 55 miles W. of Indianapolis, on the Chicago and Eastern Illinois railroad. It has a graded school, an iron-foundry and woolen and flour mills. Coal is found in this vicinity. Population 1890, 1,689; 1900, 2,045.

ROCKVILLE, a village and the capital of Montgomery County, central Maryland, 14 miles N. of Washington, District of Columbia, on the Baltimore and Ohio railroad. It is in an agricultural district, and has a courthouse, a jail and a weekly paper. Population 1900, 1,110.

ROCKWOOD, Tennessee, a town and railroad junction of Roane County, 45 miles west southwest of Knoxville, on three lines of railroads, exporting the products of its extensive iron, coal-mining, and industrial establishments. Population, 1900, 2,899. C.L.S.

ROCKY MOUNTAIN GOAT (*Haplocerus montanus*), a true antelope which inhabits the mountains from Colorado to British Columbia. Its hair is white, and a beard on the throat gives some resemblance to a goat. It is the only American form, but allied forms are found in southern Asia. See also ANTELOPE, Vol. II, p. 91.

ROCKY MOUNTAIN SHEEP, a name sometimes given to the big-horn (*Ovis montana*). It ranges from the Mexican boundary to Alaska. The animal is very active, and its flesh is excellent food. See also SHEEP, Vol. XXI, p. 821.

RODENTIA OR GLIRES. See MAMMALIA, Vol. XV, pp. 421–427.

RODGERS, CHRISTOPHER RAYMOND PERRY,

naval commander; was born in Brooklyn, New York, on November 14, 1819, son of Commodore G. W. Rodgers and nephew of Commodore Perry. He entered the navy in 1833, commanded a schooner in the Seminole War, and was active in the Mexican War. In the Civil War he distinguished himself with the frigate *Wabash* at Port Royal, led an expedition to St. Augustine and up the St. Mary's River, was conspicuous at the capture of Fort Pulaski, and was fleet-captain in the attack upon Charleston in 1863. After the war he was on foreign service, chief of the Bureau of Docks and Yards, commandant of the Naval Academy, and commander of the naval forces in the Pacific. He was made rear-admiral in 1874, retired in 1881, and died on Jan. 8, 1892. W.F.J.

RODGERS, JOHN, naval commander, member of a family illustrious in American naval annals; was born in Maryland on August 8, 1812, and entered the navy in 1828. He served in South American waters, in the Seminole War, and in coast survey work. In 1861 he had charge of the building of ironclads, in 1862 commanded the *Galena* and led a squadron up the James River, in 1863 commanded the monitor *Weehawken* and defeated the ironclad *Atlanta*, for which he received the thanks of Congress, and in 1864–65 commanded the *Dictator* on special service. In 1867 he took the monitor *Monadnock* around Cape Horn to San Francisco. Thereafter he commanded at the Boston navy yard, was in charge of the Asiatic squadron and did effective work for the protection of American interests in Corea, and was superintendent of the Naval Observatory at Washington, and succeeded Joseph Henry at the head of the Lighthouse Board. He died on May 5, 1882. W.F.J.

RODIN, AUGUSTE, sculptor; was born in Paris in 1840, and studied in the ateliers of Barye, Carrier Belleuse, and Van Rasbourg, from 1864 to 1877. He has produced many noteworthy works, among which are *L'Homme au Nez-Casse* (1864); *L'Age d'Airain* (1877); *St. Jean Prêchant* (1882); *The Creation of Man* (1882); busts of *Jean Paul Laurens*, *Carrier-Belleuse*, *Victor Hugo*, *Antonin Proust*, and *Dalou* (1882–85); busts of *Puvis de Chavannes*, *La Cariatide*, *La Danaide*, *La Pensee*, *Balzac*, *Le Baiser*, *l'Eve*, and a monument to *Victor Hugo;* busts of *Falguiere*, *Rochefort*, *Octave Mirabeau*, etc.; *Les Bourgeois de Calais* (1889); *La Porte d'Enfer; Le Frere et la Sœur; Le Printemps; L'Eternelle Idole; La Guerre; Psyche; Amor Fugit*, etc. W.F.J.

RODMAN, THOMAS JEFFERSON, soldier; was born at Salem, Indiana, on July 30, 1818, and was graduated from West Point in 1841. He served creditably in the Mexican War, but soon showed such talents in the devising of guns and ammunition that he was detailed exclusively to such duties. In 1860 he constructed his huge fifteen-inch cannon, and his mammoth powder and cake powder, the last named being quickly adopted throughout the world. These devices proved to be of great value to the Government in the Civil War, and were widely used in both army and navy. Most of his work was done in the arsenals at Pittsburg, Pennsylvania, at Watertown, Connecticut, and at Rock Island, Illinois, at which last named place he was in command from 1865 to his death. He rose to the brevet rank of brigadier-general, and died on June 7, 1871. W.F.J.

RODNEY, CÆSAR, statesman; was born at Dover, Delaware, on October 7, 1728, and filled many local offices, civil and military. He was a delegate to the Stamp Act Congress of 1765, and a signer of the address to the king in 1769. In 1774 he was sent to the Continental Congress and was a prominent member of that body. He was one of the signers of the Declaration of Independence, and thus so offended the Tories of Delaware that he failed of re-election to Congress. He was a brigadier-general of militia, and did some good work in the war. He was president of Delaware in 1778–81, and was elected to Congress in 1782, but because of ill health failed to attend the session. He died of cancer on June 20, 1784. W.F.J.

RODNEY, CÆSAR AUGUSTUS, statesman, son of Cæsar Rodney; was born at Dover, Delaware, on January 4, 1772, was graduated from the University of Pennsylvania in 1789, and in 1803 began the practice of the law. He was a Representative in Congress in 1805–07 and was concerned in the impeachment of Judge Chase; U. S. attorney-general in 1807–12; captain of a company of artillery in the War of 1812, and in 1815 a member of the Delaware State Senate. He was one of the commissioners sent to South America in 1817 to determine the fitness of the revolutionary republics for recognition, and made a report in 1819 in their favor. He was in Congress in 1821–22, in the Senate in 1822–23, and first minister to Buenos Ayres in 1823–24. He died on June 10, 1824. W.F.J.

ROE, EDWARD PAYSON, clergyman and author; was born at Moodna, N. Y., on March 7, 1838, studied at Williams College and Auburn and Union Theological Seminaries, and was chaplain in the Civil War. He was pastor of a Presbyterian Church at Highland Falls, N. Y., for a number of years, and then devoted himself almost exclusively to authorship. His first novel, *Barriers Burned Away*, was suggested by the great fire in Chicago. His other works included *Near to Nature's Heart*, *The Opening of a Chestnut Burr*, *A Knight of the Nineteenth Century*, *A Face Illumined*, *A Day of Fate*, and *His Sombre Rivals*. He was a practical gardener, and wrote *Pay and Profit in My Garden*, and *Success with Small Fruits*. He died at Cornwall, N. Y., on July 19, 1888. W.F.J.

E. P. ROE.

ROEBLING, WASHINGTON AUGUSTUS, en-

gineer, son of John A. Roebling (q.v., Vol. XX, p. 635); was born at Saxonburg, Pennsylvania, on May 26, 1837, and was graduated from the Rensselær Polytechnic Institute in 1857. He was associated with his father in the construction of the suspension bridge at Pittsburg, served in the Federal army in the Civil War and rose to the rank of colonel, and was again associated with his father in building the suspension bridges at Cincinnati and Brooklyn. The latter was scarcely begun when the elder Roebling died, and the son was entrusted with its construction. He carried it to successful completion, making it one of the modern wonders of the world. He has since been at the head of a great manufactory of wire and wire rope, at Trenton, N. J. W.F.J.

ROE-DEER. See DEER, Vol. VII, p. 23.

ROENTGEN RAYS OR RÖNTGEN RAYS AND PHOTOGRAPHY. See ELECTRICITY, §96, and PHOTOGRAPHY, in these Supplements.

ROGERS, HENRY DARWIN, geologist; was born in Philadelphia, Pennsylvania, on August 1, 1808, the son of an eminent scientist. He became professor of chemistry and natural philosophy in Dickinson College, Carlisle, Penn., in 1831, and was for a number of years state geologist of Pennsylvania and New Jersey, and made surveys and published reports and maps of those states. In 1858 he was appointed regius professor of natural history in the University of Glasgow, Scotland, and filled that place with distinction for the remainder of his life. While there he completed, in 1861, a fine *Geological Atlas of the United States*. He died at Glasgow on May 29, 1866. W.F.J.

ROGERS, HENRY WADE, educator; was born at Holland Patent, New York, on October 10, 1853, and was graduated from the University of Michigan in 1874. He was admitted to the bar in 1877, became professor in the law school of the University of Michigan in 1883 and its dean in 1885–90; was president of Northwestern University, Evanston, Ill., in 1890–1901, and since 1901 has been professor in, and since 1904 dean of, the law school of Yale University. He has written several treatises on law. W.F.J.

H. W. ROGERS.

ROGERS, JAMES BLYTHE, an American chemist and physician; born in Philadelphia, Pa., Feb. 11, 1802. He graduated at William and Mary College, Va., studied medicine, and practised for a short time. He became superintendent of a chemical works in Baltimore, and later professor of chemistry in the Washington Medical College, there. In 1835 he took a similar position in the medical department of Cincinnati College, which he held for four years. In 1840 he removed to Philadelphia, where he lectured on chemistry in the Philadelphia Medical Institute, the Franklin Institute, and the Franklin Medical College. In 1847 he became professor of chemistry at the University of Pennsylvania. He was a member of the Franklin Institute, the American Philosophical Society, and the Academy of Natural Sciences. He died in Philadelphia, June 15, 1852. E.E.T.

ROGERS, JAMES EDWIN THOROLD, economist; was born in England in 1823, and became professor at Oxford, but is most remembered as the historian of economics. His chief work was *The History of Agriculture and Prices in England* (1866–68), which has been abridged into *Six Centuries of Work and Wages* (1885). He also wrote *Cobden and Modern Political Opinion* (1873); *The First Nine Years of the Bank of England* (1887); the *Economic Interpretation of History* (1888), and *The Industrial and Commercial History of England* (1892). He died on October 12, 1900. W.F.J.

ROGERS, JOHN, an American sculptor; born in Salem, Mass., Oct. 30, 1829. He received a common-school education, and worked as a machinist in Manchester, N. H.; in his leisure time making experiments in modelling. At the age of 28 he went to Paris and Rome to study art, and shortly after his return exhibited his statuette group, *The Checker Players*, which attracted considerable attention. His next group, *The Slave Auction*, exhibited in 1860, gave him a still wider reputation, and he established a studio in New York. Among his best-known groups are *The Picket Guard; One More Shot!; The Union Refugees; The Wounded Scout; Uncle Ned's School; How the Fort Was Taken; Taking the Oath; The Fugitive's Story; The Council of War; The Landing of the Norsemen;* and illustrations of *Rip Van Winkle*, and *The Legend of Sleepy Hollow*, etc. His larger statues include that of John F. Reynolds, in Philadelphia; and that of Abraham Lincoln, exhibited at the World's Fair, Chicago. He died in New Canaan, Connecticut, July 27, 1904. E.E.T.

JOHN ROGERS.

ROGERS, RANDOLPH, an American sculptor; born in Waterloo, N. Y., July 6, 1825. He studied in Rome under Bartolini; and lived in New York, 1850–55, exhibiting several works which gave him a wide reputation, among which are *Nydia; A Boy and a Dog; Isaac;* and *The Lost Pleiad*. After 1855 he settled in Rome. Among his most important works are the bronze doors of the extension of the Capitol at Washington; the completion of the Washington monument at Richmond, Va., begun by Crawford; the statue of John Adams at Mount Auburn Cemetery; the *Angel of the Resurrection* on the Colt

monument at Hartford; a memorial monument representing Michigan, at Detroit; a statue of Pres. Lincoln, at Philadelphia; that of W. H. Seward, in New York; the *Genius of Connecticut*, on the Capitol at Hartford; and a bronze group of Indians. He died in Rome, Jan. 15, 1892. E.E.T.

ROGERS, William Barton, an American physicist and geologist; born in Philadelphia, Pa., Dec. 7, 1804. He graduated at William and Mary College in 1822; kept a private school in Baltimore; was professor of natural philosophy and chemistry at William and Mary College; became professor of natural philosophy at the University of Virginia in 1835; and was head of the geological survey of Virginia, 1835–42. In 1853 he resigned his professorship and removed to Boston, where he was one of the founders of the Massachusetts Institute of Technology, of which he became president in 1862 and also professor of physics and geology. He resigned his position in 1870, but resumed it in 1878. He died in Boston, May 30, 1882. E.E.T.

ROGERSVILLE, Tennessee, the seat of Hawkins County, a town on the southeastern base of the Clinch Mountains, and the terminus of a division of the Southern railroad, 54 miles northeast of Knoxville. It is the seat of the Synodical (Presbyterian) Female College and of McMinn Academy. Its industrial interests are agricultural. Population, 1890, 1,153; 1900, 1,386. C.L.S.

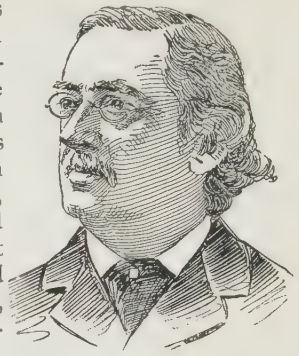
ROGUE RIVER. See Oregon, Vol. XVII, 846.

ROHLFS, Anna Katherine Green, novelist; was born at Brooklyn, N. Y., on November 11, 1846, and was graduated from Ripley College, Poultney, Vermont. She has written a number of "detective" stories of merit, including *The Leavenworth Case* (1878); *The Sword of Damocles; The Mill Mystery; Dead Man's Lane; A Strange Disappearance; That Affair Next Door; Hand and Ring; X. Y. Z.*, and *Behind Closed Doors*. She has also written a dramatic poem entitled *Risifi's Daughter* (1866). W.F.J.

ROHLFS, Gerhard, a German-African explorer; born at Vegesack, April 14, 1831. He studied medicine, and served as surgeon in the French campaigns of 1855–60. In 1860 he explored Morocco and Fez, and, in 1862, the oasis of Tafilet. In 1863 he traveled from Tangier to Tuat, and in 1865 from Tripoli to the Chad Lake and the coast of Guinea. In 1867 he took part in the English expedition to Abyssinia, and explored, from 1873–74, the Lybian Desert. In 1878 he visited the oasis of Kufra, starting from Tripoli, and in 1880 the capital of King Johannes of Abyssinia. In 1884 he was appointed consul-general and imperial commissioner at Zanzibar, returning in 1885 to Germany, where he died at Rüngsdorf, June 2, 1896. He wrote *Land und Volk in Afrika* (1870); *Beiträge zur Entdeckung und Erforschung Afrikas* (1876); *Reise von Tripolis nach der Oase Kufra* (1881). G.A.S.

ROLF. See Rollo, Vol. XX, p. 643.

ROLFE, William James, an American scholar; born in Newburyport, Mass., Dec. 10, 1827. He received his education at the Lowell high school and at Amherst College, where he graduated in 1849. From 1852 to 1868 he was headmaster in the high schools of Dorchester, Lawrence, Salem, and Cambridge, Mass., but since then has devoted himself to editorial work, literary criticism (especially of Shakespeare), and authorship. He received the degree of Master of Arts from Harvard in 1859, and from Amherst in 1865, and that of Doctor of Letters from Amherst in 1887. He is the editor of *Craik's English of Shakespeare* (1867); *Complete Edition of Shakespeare*, 40 volumes (1870–83); *Complete Edition of Scott's Poems* (1887); *Minor Poems of Milton* (1887); *Macaulay's Lays of Ancient Rome* (1888); *Rolfe's Students' Series of Standard English Poems* (1882–87); *Mrs. Browning's Sonnets from the Portuguese* (1886); *Select Poems of Robert Browning* (1886); *Select Dramas of Robert Browning* (1887); *Tales of Chivalry* (1887); *Tales from English History* (1888); *Fairy Tales* (1889); *Tales from Scottish History* (1891); *Lamb's Tales from Shakespeare* 2 vol. (1892); a *Complete Edition of Tennyson*, 12 volumes (1895–98), and the Cambridge edition of the same in one volume (1899); *Shakespeare the Boy* (1896); *Life of Shakespeare*, published as Vol. 22 of the New Century edition of Shakespeare (1902). He is also a frequent contributor to reviews and magazines. E.E.T.



WILLIAM J. ROLFE.

ROLLA, Missouri, the seat of Phelps County, a city on the St. Louis & San Francisco railroad, 50 miles southeast of Jefferson City. It is the seat of the State School of Mines and Metallurgy, and has iron-mining and flour-milling industries. Population, 1900, 1,600. C.L.S.

ROLLIT, Sir Albert Kaye, publicist; was born at Hull, England, in 1842, and was educated at King's College and the University of London. He became a lawyer and was president of the Incorporated Law Society in 1863. He was knighted in 1885, and has been a member of Parliament since 1886. He has filled many places in chambers of commerce and similar organizations, has done much for the promotion of commercial interests, and has received many honorary degrees and knightly decorations. W.F.J.

ROLLING-MILLS. On the general subject of rolling-mills, see Iron, Vol. XIII, pp. 337–340; and Iron and Steel, in these Supplements.

ROMAIC or MODERN GREEK. See Greece, Vol. XI, pp. 104, 106, 132.

ROMAN ARCHÆOLOGY. See Rome, Vol. XX, pp. 825–859.

*ROMAN CATHOLIC CHURCH, commonly

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known as the Catholic Church, the body of Christians throughout the world who profess the same doctrine, partake of the same sacraments, and recognize the spiritual supremacy of the Pope, the Bishop of Rome. The subject may be treated most conveniently by considering, under separate heads, the doctrine, government, history, and statistics of this powerful and widespread religious organization.

1. Catholics believe that there is one God, in three divine persons,—Father, Son and Holy Ghost; that God, by his word only, and out of nothing, created heaven and earth and all things; that angels and men are the chief creatures of God; that some of the angels sinned and were punished; that Adam and Eve, the first man and woman, disobeyed the command of God, and were punished by the loss of justice and innocence, and by sickness and death; that this deprivation of justice is original sin, and all men are born with this defect or sin; that through the merits of her divine Son, and because she was to be his mother, the Blessed Virgin Mary was preserved free from this original sin, which privilege is called her Immaculate Conception. Catholics believe that God the Son, the second person of the Blessed Trinity, by the power of the Holy Ghost, assumed human nature of the Blessed Virgin Mary, and is called the God-man, Jesus Christ; that for this reason the Blessed Virgin Mary, although a creature, is called the mother of God, and is deserving of a very special, but not divine, honor,—divine honor being paid to God alone. They believe that Jesus Christ, by his suffering and death, redeemed men, and obtained for them grace, or supernatural help, whereby they may be saved; that the chief channels of grace are the seven sacraments, all of which were instituted by Christ; viz., Baptism, in which original sin, and actual sins committed before baptism is received, are forgiven; Confirmation, which makes those baptized strong and perfect Christians; Holy Eucharist, which is the sacrament of the body and blood, soul and divinity, of Jesus Christ, really present under the appearances of bread and wine; Penance, in which sins are forgiven which are committed after baptism; Extreme Unction, which is for the help and comfort of those in danger of death by sickness; Holy Orders, by which bishops, priests, and other ministers of the church are ordained and receive the power and grace to perform their sacred duties; Matrimony, which unites a Christian man and woman in lawful marriage, and gives them grace to live happily together.

Members of the Roman Catholic Church likewise believe that Jesus Christ, the true Son of God, instituted a church or society, and that to certain ones, i.e., the priesthood in this church, he intrusted the administration of the sacraments and the teaching of his doctrine divinely revealed; that the divinely appointed visible head of the church, the Pope of Rome (the invisible head is Jesus Christ) is, by the aid of the Holy Ghost, and must be, infallible; i.e., he cannot err, when officially teaching the whole church a doctrine regarding faith or morals. This, in their belief, does not imply that the Pope cannot sin, or make a mistake in other matters, as some non-Catholics have been led to suppose. Catholics also believe the will of God, is that all are bound to belong to the church, and he who knows the church to be the true church, and willfully remains out of it, cannot be saved. Such a person willfully disobeys God, and refuses the divine assistance necessary for salvation. Reasons of convenience, of prejudice, or of human respect, they say, God will not accept, nor will a sincere and intelligent man offer. While believing this in regard to the church, they are nevertheless not to be the judges of their fellow-men in regard to salvation, which finally depends on their interior dispositions, known only by God and by themselves.

Catholics also believe that as Jesus Christ is God, he can do all things, and particularly that he can forgive sins, and that he can change the substance of bread and wine into the substance of his body and blood. They believe, moreover, that, if he wishes, he can appoint men to do the same things in his name and by his power. They believe that, as a matter of fact, he has given this power to certain men, viz., to the priesthood of the church, and they prove this from Scripture and tradition to their satisfaction. They believe a man must be truly sorry for his sins, otherwise they will not be remitted, even though absolution be given; and they repudiate as an insult the charge that money, or any consideration, is received by priests for the forgiveness of sins. According to Catholic doctrine, an indulgence is a remission, in whole or in part, of the temporal punishment due to sin. It is not a pardon of sin, nor a license to commit sin, and one who is in mortal sin cannot gain an indulgence. Further, according to Catholic doctrine, the marriage of Christians is a sacrament, and cannot be dissolved by any court, but only by the death of either the husband or wife. The church forbids the marriage of Catholics with persons who have a different religion, or no religion at all, because such marriages generally prove unhappy, and lead to contentions or indifference, to loss of faith, and to the neglect of the religious education of the children. The removal of this prohibition is called a dispensation. Catholics maintain that all men are bound to believe the revelation of God and keep his commandments. They believe in heaven,—a state in which the good are rewarded eternally; they believe in hell,—a state to which the wicked are condemned eternally; they believe in purgatory,—a state in which those suffer for a time who die guilty of venial sins, or without having satisfied the temporal punishment due to their sins; they believe in a general resurrection of the dead, followed by a general judgment, after which purgatory will cease, and the souls of the just, reunited to their bodies, will be rewarded forever, and the souls of the wicked, also reunited to their bodies, will be punished forever. They, therefore, believe the salvation of the soul is the most important affair of life.

Catholics maintain that all of the doctrines of the church, of which the above is a synopsis, are contained in the revelation of God; that this revelation is found in the unwritten and the written Word of God, or in tradition and Scripture; that tradition finds its infallible expression in the teaching

church; that both are of equal value, in as far as they transmit the divine revelation, Scripture, because it contains and is the Word of God, inspired by the Holy Ghost to the sacred authors; tradition, because it is preserved from error by the assistance of the Holy Ghost. While, therefore, members of the Catholic Church revere and use the Bible, still they believe that the Scriptures alone do not contain all the revelation of God. They maintain, moreover, that the proximate rule of faith, given by God, and accessible to every one, is the teaching of the church, or the whole Word of God, both written and unwritten, and this as taught and explained by the church, through the organ of the successors of the apostles; that such is the establishment of Christ, and the practice since the first ages.

As a teaching body, in consequence of her articles of faith, the church is opposed to secret societies in which religion is travestied and belief in its supernatural quality destroyed or endangered, or in which conspiracies against civil and ecclesiastical authority are conceived or assisted, directly or indirectly. She forbids her members joining them. The church believes in the religious education of children, and hence, in the United States, because circumstances are such that religion is not taught in public schools, she has private and parochial schools, where both secular and religious instruction are given. She does not oppose the public schools, but, on the contrary, willingly acknowledges their opportuneness for the instruction of children whose parents are not of the Catholic faith. That temperance in all things is a cardinal virtue, is part of Catholic doctrine; hence, as a teaching body, the church can adopt neither extreme. She decries the great evils of intemperance and the saloon element on the one hand, but on the other she admits a licit use of both food and drink.

2. The government of the Roman Catholic Church is vested in its clergy, as distinguished from the laity. There is a growing tendency, however, especially in the United States, to give the laity a consultative voice, particularly in financial and school matters. The visible head of the church is the Pope. By virtue of his primacy he has full and supreme power of jurisdiction over the whole church, not only as the infallible teacher in questions of faith and morals, but also as the ruler in what pertains to the discipline and government of the church throughout the world. Hence he can examine and decide all ecclesiastical causes and receive appeals from all ecclesiastical tribunals. To him exclusively belongs the right of treating major causes, such as questions of faith, the erection of episcopal sees, the canonization of saints, the trial of bishops. Those who assist the Pope as ruler of the universal church make up what is called the Roman Court. This is composed of the Sacred College of Cardinals (see CARDINAL, in these Supplements), of several congregations of these same cardinals, of some other tribunals, and of those legates, vicars, administrators, who are called Apostolic,—that is, sent by the Apostolic See and fortified with its authority and jurisdiction.

The College of Cardinals is chosen by the Pope. All that is necessary is for the Pope to announce the name of a new cardinal. Failure to receive the insignia will not preclude a cardinal from participating in the conclave, which is a gathering of the cardinals for the election of a new Pope. Cardinals are now chosen from various countries, so that the ecclesiastical interests of all countries may be recognized, and the Pope have counselors throughout the world. According to present discipline there may be seventy cardinals, though really the number is optional with the sovereign pontiff. Six of these are cardinal bishops, fifty cardinal priests, and fourteen cardinal deacons. The cardinal bishops are the bishops of Ostia, Porto, Frascati, Sabina, Palestrina, and Albano, all in the vicinity of Rome. The cardinal priests are bishops or priests of dioceses throughout the world, who also have a church in Rome called their *title*. Cardinal deacons have each a deaconry in Rome, sometimes also called a title. The peculiar office of the College of Cardinals is to assist the Roman pontiff in ruling the universal church, and in case of vacancy in the Apostolic See, to assume the guidance of the church in necessary affairs until the election of a new Pope. These duties are performed by the cardinals as a body, not as individuals. The dignity of the cardinalate is, after that of the Pope, the highest in the church. It is greater than that of bishops, archbishops, primates or even patriarchs. Whether this precedence was obtained by cardinals only in the eleventh or twelfth century, or whether by right and in fact they always held it, is a controverted question. The Pope usually advises with the cardinals on important matters, though he is not bound to do so.

The method of selecting his successors is determined by the Pope. Whether he can choose his own successor is a controverted and delicate question. As a matter of fact, some popes have pointed out those whom they deemed best fitted to succeed them, but church history has no record of any supreme pontiff choosing his own successor, except Boniface II, in 529. The next year, however, he recalled his decree and declared it annulled. The selecting of the Pope has been different in different ages. In the first ages the election pertained to the priests and deacons of Rome. Later, the Roman people also bore testimony to the candidate's character. From the fifth to the eleventh century, emperors and kings usurped authority in the matter. In 1059 Pope Nicholas II made the cardinal bishops the sole electors of the pope, and in 1178 Pope Alexander III decreed that the election should pertain to all the cardinals, but to them alone. The secret conclave was introduced in 1274, and in 1740 the present method was perfected. A two-thirds vote is required to elect. The governments of France, Austria and Spain claimed the privilege of each excluding one objectionable candidate, but Pius IX, in three bulls published in 1871, 1872 and 1873, abolished this claim after the loss of the Papal States. Pope Leo XIII likewise has denied this privilege, though, as a matter of fact, the cardinals themselves, from motives of prudence, may respect these exclusions in future conclaves. Any man of any nationality, even a layman, may validly be

elected Pope, and as soon as he is elected and consents, he has full jurisdiction as the supreme pastor of the church. For some centuries, however, none but cardinals have been elected to the papacy. If the elected Pope is not yet a bishop, he is consecrated, by the dean of the Sacred College, the cardinal bishop of Ostia. During a vacancy, the dean of the Sacred College, the senior cardinal priest, and the senior cardinal-deacon, together with the camerlengo, assume the administration of the affairs of the Apostolic See for the College of Cardinals. A vacancy occurs through the death or resignation of the Pope, and until a new Pope is elected the pontifical jurisdiction is in abeyance, for the College of Cardinals, especially since the decree of Pope Gregory X in 1274 to that effect, can neither validly nor licitly exercise it, even by interpreted delegation.

In the first ages, the Pope advised with the Roman clergy, and later with the bishops of Italy, concerning the more important affairs of the church throughout the world. In time, the cardinals became his special counselors, and met with him nearly every day in consistory (see CONSISTORY, in these Supplements). But because of the mass of business which required extended examination, many cases were assigned to various committees and officials, and a number of permanent congregations and tribunals were instituted. At the present time, only the most important business is reserved for the consistory, which is called at the option of the Pope, and now meets only about twice a year. The congregations (see CONGREGATIONS, ROMAN, in these Supplements) are composed of several cardinals, assisted by officials and consultors, and have authority to hear and decide causes, both in the first instance, and on appeal from diocesan courts in the various countries of the world. When the Pope approves their finding, the decision is final, though sometimes a rehearing may be granted. Church matters referred to the Pope from dioceses in the United States, England, Ireland, Scotland, Canada, Australia, Holland, and missionary countries are sent to the Congregation of the Propaganda (see PROPAGANDA, in these Supplements). All business in the Propaganda is done gratuitously, even documents being furnished without charge. Most of the other congregations and tribunals collect specified fees for services. There are at least twenty congregations to which causes are referred, each having its specialty. Besides the congregations, there are three tribunals for affairs of justice, and three for hearing and granting petitions for favors. Appointments are made usually through the apostolic chancery, especially appointments of bishops. The secretary of briefs issues papers for favors of smaller moment, and the secretary of state attends to the diplomatic relations of the Holy See with countries having representatives at the Papal court. Nuncios and legates also receive instructions through this secretary, who is always a prominent cardinal. There are also various prelates attached to the Roman court, prothonotaries apostolic, domestic prelates, and chamberlains, who have rank throughout the world. Not a few such prelacies are honorary dignities conferred on priests away from Rome.

3. Apostolic legates, vicars, administrators, and missionaries are sent by the Holy See to various countries, either to hear and decide church controversies, or to preach the Gospel where it is not yet known. Thus in former times, St. Patrick was sent to Ireland, St. Augustine to England, St. Boniface to Germany. For a similar purpose, monks accompanied Columbus and Cabot in their voyages of discovery, and Marquette, Jogues and others preached to the Indians living near the Great Lakes. As soon as there is a sufficient number of Catholics, bishops are appointed to rule the church in a specified territory, called a diocese. Priests are by them appointed to preach and to administer the sacraments to the Catholic people of a specified territory, called a parish. It is the spirit and the policy of the Catholic Church that both bishops and priests be natives of the countries where they administer, and to this object the church in the United States especially is tending. For a similar reason, to preclude the necessity of appealing church controversies to Rome, there to be heard before one or another of the congregations, the Apostolic Legation was established in Washington, with power to hear and finally adjudicate many, if not all, questions of discipline arising in the Catholic dioceses of the United States. The legation also tends to insure unity of action and uniformity of discipline in the various dioceses, though they are governed immediately by their respective bishop or archbishop. The legation was established Jan. 24, 1893, and Monsignor Francis Satolli, titular archbishop of Lepanto, was appointed the first delegate apostolic. An auditor to examine cases and a secretary also were appointed. Nov. 29, 1895, Monsignor Satolli was made a cardinal, and after serving for eight months more as pro-delegate, was recalled to Rome. The apostolic delegation in Washington is ecclesiastical, not diplomatic.

The first Catholic bishop in the United States was Most Rev. John Carroll of Baltimore, appointed in 1790. Under him, at that time, were 20 priests and 30,000 lay people, scattered throughout the 13 states, but particularly in Maryland, Pennsylvania and the territory northwest of the Ohio. Most of these were native-born. Bishop Carroll's calculation makes the number 44,000. In 1803, with the annexation of Louisiana, 30,000 Catholics, born there, were added to the natural increase, so that in 1810 there were 90,000 native-born and 30,000 foreign-born Catholics. In 1830 the Catholics born in the United States had gained, by natural increase, 81,500, making 231,500 out of a total Catholic population of 361,000. In 1850 the Catholic population was about 1,876,470, of whom not more than 800,000 were from abroad. In 1860 the Catholic population was 3,000,000, of whom at least 1,701,470 were natives, the natural increase by births over deaths being at least 625,000. In 1870 there were 4,685,000 Catholics, of whom 2,786,470 were born in the United States. The total foreign-born population that year was 5,567,229, of whom 1,898,530 were Catholics. In 1880, out of 7,000,000 Catholics, 4,468,470 were native-born. The foreign-born Catholics were 2,531,-

530, out of a total foreign-born population of 6,679,943, as reported by the census. In 1890 the Catholic population was certainly 10,000,000. Of these, over 6,750,000 were natives and 3,250,000 of foreign birth. These figures are substantiated, also, by a calculation made according to the English tables of mortality; for, taking the number of Catholic births from the year 1800, and calculating the survivors, there must have been, not including Indians and negroes, over 6,000,000 native-born Catholics in 1890. In 1896 there were surely 12,000,000 Catholics in the United States, of whom no fewer than 8,250,000 were native-born. From these figures it will be seen that the great body of Catholics in the United States is, and always has been, mostly native-born and English-speaking, and that those of American parentage far outnumber those born in America of foreign parentage.

The spiritual wants of these 12,000,000 Catholics in 1896 were supplied by 10,348 priests, of whom 7,756 were seculars and 2,592 members of religious orders. There were 9,500 church buildings, besides 5,093 stations and chapels. There were 243 orphan asylums and 836 other charitable institutions, supporting 33,064 children. The number of parochial schools was 3,361, and of high schools or academies, 187 for boys and 633 for girls, which, together, educated 796,348 pupils. There were, also, 28 seminaries for ecclesiastical students, besides 3 Catholic universities empowered to confer degrees by pontifical authority, with all privileges recognized by the church. The territory of the United States is divided ecclesiastically into 68 dioceses, 4 vicariates and 14 archdioceses, governed by 72 bishops and 14 archbishops. Grouped with each archdiocese are several dioceses, which, together, make 14 ecclesiastical provinces. The work of priests, ordinarily, is to preach, offer mass, and administer the sacraments, except confirmation and holy order, in parish churches, for the benefit of the people. Bishops give confirmation and holy order, and under canon-law rule the clergy of the diocese. An appeal lies from a priest to the bishop of the diocese, and from him to the archbishop of the province, or to the Apostolic Legation in Washington. An appeal may be taken from an archbishop's court to the court in Rome, but no regular appeal can be taken from the legation. Against its decision only a recourse may be made to Rome, but it is rarely effectual.

Precedence is carefully observed in the church, to avoid confusion. Not having national customs in the United States, the general rules of canon law, together with the special regulations of the Baltimore plenary councils and the practice of the Roman court, determine the precedence of some of the clergy over others. (See TITLES, ROMAN CATHOLIC, and FORMS OF ADDRESS, in these Supplements.) After the Pope, cardinals rank first, according to their order and the time of their creation. Archbishops rank next, in the United States, according to promotion to an archbishopric. Then bishops, according to the date of their consecration. Both bishops and archbishops, according to the practice of the Roman court, are entitled "The Most Reverend," the only distinction being the addition of the word "Archbishop" or "Bishop." In a diocese, after the archbishop or bishop, the first in rank is his vicar-general, who represents him in certain acts. Then rank the diocesan consultors, who act as counselors of the bishop, and in case of vacancy in the diocese, together with the irremovable rectors, select three candidates for a new bishop, who is appointed by the Pope. The irremovable rectors rank next, followed by rural deans, if any, and the other clergy. The vicar-general is addressed "Very Reverend," all the others "Reverend." Roman prelates living in a diocese rank next to the vicar-general, prothonotaries first, then domestic prelates, then chamberlains. All these may be addressed "Monsignor."

4. The whole number of Catholics in the world has been estimated variously. Some claim there are 250,000,000; others, depending largely on statistics compiled from reports made to the Propaganda, place the number at about 235,000,000. The fact should not be overlooked, that in diocesan reports only those who are known to be Catholics are counted, many thus being unnumbered. This is especially true of such places as the United States, Canada, Australia, Asia, and Africa. Distributed in round numbers, in Europe there are 158,000,000; in South America, 33,000,000; in Mexico and Central America, 15,000,000; in the West Indies, 3,000,000; in the United States, 12,000,000; in Canada, 2,200,000; in Asia, 8,312,000; in Africa, 2,656,000; in Australia and adjacent islands, 700,000, —making a total of 234,868,000 Catholics throughout the world. It seems unnecessary to state that all Catholics owe full civil allegiance to the governments of the countries wherein they dwell. It may be interesting, however, to note that there are, under the flags of republics, more Catholics than all other people of any and no religious belief. In the republics of Europe and Africa there is a total population of about 43,550,000, of whom all but 4,456,000 are Catholics. The total population of all the republics of North and South America, estimating the United States at 63,000,000, is about 113,000,000, of whom at least 61,500,000 are Catholics, 51,500,000 being non-Catholic, or about the proportion of 15 Catholics to 13 who are not Catholic. In the whole world there are, under republican flags, about 101,000,000 Catholics to about 55,500,000 who are not Catholic. Under the various monarchical governments of Europe there are 119,000,000 Catholics, and, including Russia, 170,000,000 who are not Roman Catholics. The unity of the Catholic Church is preserved throughout the world by all members recognizing one supreme head in spiritual matters. Though bishops are chosen in various ways, still, that they may validly be installed, their election must be confirmed directly or indirectly by the Pope. While, by consecration, the bishop receives directly from God the character and powers inherent in the episcopacy, still, to a certain extent, the exercise of these powers, and his jurisdiction over a specified territory called a diocese, depend on the pope. Thus by pontifical authority bishops may be transferred willingly from one diocese to another, or even unwillingly deposed for grave cause. The see of the Pope is Rome. The 6 cardinal-bishops have sees near Rome. The car-

dinal priests have 53 churches or titles, and the cardinal deacons 16 deaconries in the city of Rome, but several of these titles never are filled. There are eight patriarchal sees of the Latin rite and 6 of the Oriental rites. Of archiepiscopal sees of the Latin rite, 19 are subject immediately to the Holy See, and 154 have ecclesiastical provinces. Of the Oriental rites, there are 18, making 191 residential archbishoprics in the world. Of episcopal sees of the Latin rite, 85 are subject immediately to the Holy See, and 626 belong to ecclesiastical provinces, being suffragan to archiepiscopal sees. Of the Oriental rites, there are 54 episcopal sees. There are also 86 titular archbishoprics and 434 titular bishoprics, which the Holy See is accustomed to confer, in order that the persons thus promoted may fill important offices in the Roman court, or act as auxiliary and coadjutor bishops to the incumbents of residential sees throughout the world. Besides these, the Propaganda has 2 titular archbishoprics and 27 titular bishoprics which it may confer with the consent of the Pope. There are 17 abbacies and prelacies belonging to no diocese. There are also 8 apostolic delegations, 125 apostolic vicariates and 39 apostolic prefectures subject to the Propaganda.

The residential sees, mentioned above, of the Latin rite are found as follows: In Austria-Hungary there are 11 archbishoprics and 44 bishoprics; in Belgium, 1 archbishopric and 5 bishoprics; in France, 17 archbishoprics and 67 bishoprics; in Germany, 5 archbishoprics and 21 bishoprics, of which 7 are subject immediately to the Holy See; in Great Britain, there is 1 archbishopric in England, with 14 bishoprics; 4 archbishoprics in Ireland, with 25 bishoprics; 2 archbishoprics in Scotland, with 4 bishoprics. Two bishoprics in Malta are subject immediately to the holy see, as is also the see of Glasgow, in Scotland. Greece has 3 archbishoprics and 5 bishoprics. Holland has 1 archbishopric and 4 bishoprics. Italy has 49 archbishoprics, of which 12 are immediately subject to the Holy See, and 222 bishoprics, of which 65 are immediately subject. Monaco, Montenegro and Bulgaria have each 1 bishopric. Portugal has 3 archbishoprics and 9 bishoprics; Roumania and Servia have 1 bishopric each. Russia, with Poland, has 2 archbishoprics and 13 bishoprics. Spain has 9 archbishoprics and 45 bishoprics; Switzerland has 5 bishoprics, all immediately subject; and Turkey 3 archbishoprics and 4 bishoprics. In Asia, Turkey has 2 archbishoprics and 1 bishopric. Japan has 1 archbishopric and 3 bishoprics. Oriental India has an apostolic delegation, 8 archbishoprics and 22 bishoprics. In Persia, there is 1 bishopric and several prefectures. A number of vicariates and prefectures cover China and the rest of Asia. These latter exist where missionary priests are preaching the Gospel but no hierarchy is yet established. In Africa, there are 2 archbishoprics and 11 bishoprics, besides 26 vicariates and 20 prefectures. Australia has 5 archbishoprics, 14 bishoprics, 4 vicariates and 1 prefecture. New Zealand, the Philippine and other islands have 2 archbishoprics and 7 bishoprics, with 10 vicariates and 2 prefectures.

In America, Canada has 7 archbishoprics and 21 bishoprics, with 3 vicariates and 3 prefectures. The United States have 14 archbishoprics and 68 bishoprics, with 4 vicariates and 1 prefecture. Mexico has 6 archbishoprics and 21 bishoprics. Central and South America have 14 archbishoprics and 66 bishoprics, each country making an ecclesiastical province. From these statistics it will be seen that the Roman Catholic Church is spread into all countries of the globe. The Latin language is used in the liturgy of all these churches, thus giving them a common medium of communication, both in church services and in councils. While unity with the Holy See is considered necessary, still, uniformity is not always required either in liturgy or discipline.

The Oriental churches in communion with the Holy See, holding the same faith and the same principle of authority as the Latin Church, have their own special rites, discipline and liturgical language. The various rites are the Armenian, Coptic, Ethiopic and Abyssinian; Greek, with Græco-Roumanian, Græco-Ruthenian, Græco-Bulgarian, Græco-Melchite subdivisions; Syrian, with Syro-Chaldean, Syro-Maronite, Syro-Malabaric subdivisions. In the Western or Latin Church, the liturgy, or the word-form of the mass, is that used by the Roman Church. To-day the only exceptions are the Ambrosian liturgy, peculiar to the Cathedral of Milan, and the Mozarabic, confined to the city of Toledo, in Spain. In the East, to-day, the chief liturgies, or word-forms of the mass, in general use are those prepared by St. John Chrysostom and by St. Basil the Great. These liturgies are used by both Catholics and schismatics. Both these forms for saying mass were originally written in Greek. Other Eastern liturgies are those ascribed to St. James the Apostle, afterward modified by St. Cyril of Jerusalem, and to St. Mark, formerly used throughout the patriarchate of Alexandria; but the latter is scarcely used at the present day, and the former only among the Syrians and Copts, with considerable changes. There are, then, in general use, in the Catholic Church, four principal liturgies, or word-forms of the mass. However, mass is said in nine different languages, viz., in Latin, Greek, Syriac, Chaldaic, Slavonic, Wallachian, Armenian, Coptic, and Ethiopic. These languages, as they appear in the liturgy, are quite different from the same languages as spoken to-day.

The Armenians in communication with the Holy See are allowed to use the Armenian language in their liturgy, and also to have special rites. Unlike all other Christians of the East save the Maronites, they use unleavened bread in the Holy Eucharist, as do the Latins. The heretical Armenians are *Monophysites*,—i.e., believers in but one nature, the divine, in Jesus Christ. The Catholic Armenians are found in Armenia, Asia Minor, Syria, Palestine, Turkey, Georgia, Greece, Egypt, Italy, Austria, and Russia. They number about one hundred and fifty thousand, and are governed by a patriarch styled "Patriarch of Cilicia of the Armenians." He resides at Constantinople. Besides the patriarch, there are two archbishops and 16 bishops. They have a college in Rome and a seminary at Begourmar, in Mount Lebanon. On the island of San Lagaro, at Venice,

they have a monastery which is famous all over the world for its printing-presses. Here most of the Armenian ecclesiastical books are printed.

The Copts in communion with the Holy See formerly were governed by a vicar apostolic residing at Cairo, but in November, 1895, Pope Leo XIII constituted for them a regular hierarchy, with a patriarch styled "Patriarch of Alexandria of the Copts." Besides the patriarch, they have two bishops. They number about thirty thousand. The heretical Copts, of whom there are one hundred and fifty thousand, are Monophysites. The Copts use three different liturgies in the celebration of mass, those of St. Basil, St. Gregory and St. Cyril. They have as many as twelve liturgies, but these three are the chief ones now used. The Coptic, or ancient Egyptian language, is used in celebrating their church services, but the rubrics are given in Arabic.

The Ethiopic or *Abyssinian* rite differs little from that of the Copts, either in discipline or church customs. The Catholic Abyssinians now number about twenty-five thousand. They are governed by a Latin vicar apostolic. The schismatic or heretical Abyssinians, of whom there are three million, are Monophysites. The church language is old Ethiopic, which is quite similar to the Hebrew.

In *Greek*, mass is said to-day by the Uniate or *Melchite* Catholics. They are to be found in Syria, Jerusalem, Russia, Greece, Italy, and in several other places in Europe. There are some, also, in America. They are called Melchite, from *Malko*, the Syriac for king, because they retained the faith and supported the Emperor Marcian against the Monophysite heretics at the time of the Council of Calcedon (A.D. 451). These Catholics are allowed by the Holy See to retain all their ancient rites, such as consecrating the Holy Eucharist in leavened bread, giving communion in both kinds, saying the creed without the "Filioque," and putting warm water into the chalice after consecration. The lower orders of the clergy are allowed to marry, and when promoted to subdeaconship, deaconship, and priesthood, they may retain their wives. But after receiving the higher orders they cannot marry. Bishops must all be single men. The Greek Catholics have three different liturgies for celebrating mass. The first, that of St. John Chrysostom, which is used ordinarily; the second, that of St. Basil, which is used on all Sundays in Lent except Palm Sunday, on Holy Thursday, Holy Saturday, the vigils of Christmas and Epiphany, and the feast of St. Basil, January 1st. The third liturgy is called the "Presanctified," and is used during Lent, except on Sundays. The Græco-Melchite Catholics, of whom there are about one million one hundred thousand, are governed by a patriarch, v ho is styled "Patriarch of Antioch of the Greek Melchites," but who lives in Damascus. They have, also, three archbishops and nine bishops.

In the *Slavonic* language the Græco-Bulgarians and the Græco-Ruthenians in communion with Rome celebrate mass according to the Greek liturgies. The same liturgy and language are used, also, by the schismatic church of Russia. The *Græco-Bulgarian* Catholics, in number about thirty-three thousand, have one archbishop administrator apostolic for the Bulgarians of Constantinople, and two bishops, one for Thrace, the other for Macedonia. A large number of Bulgarians follow the Roman instead of the Greek rite.

The *Græco-Ruthenian* Catholics are found chiefly in Galicia, Poland and Hungary. They have one archbishop and eight bishops, governing about four million adherents. Many Ruthenians use the Roman liturgy in the Slavonic tongue. The right to use the Slavonic language in celebrating mass was accorded in the ninth century by Pope Adrian II, when St. Methodius and St. Cyril converted the Slavs to the faith. Since the seventeenth century, when a great number of them came into the church, the *Wallachians*, with the tacit consent of the Holy See, have been saying mass in their native tongue, which, however, is the old classic language no longer in daily use. The liturgy is the Greek.

The *Græco-Roumanian* Catholics, which term includes the Wallachians, in a great national synod held in 1700 at Fogaras, "freely and spontaneously, by the impulse of God," concluded a union with the Roman Catholic Church. On that day about a million people were united to Rome. In 1854, Pope Pius IX, erected into an ecclesiastical province the United Roumanian Church, with an archbishop and three bishops. The United Catholics are chiefly in Transylvania and Hungary, and number about one million five hundred thousand. They have two native seminaries, besides several places in the Greek College in Rome given them by Pius IX.

The *Syriac* rite, like the Greek, has several subdivisions. These are Pure-Syrian, Syro-Chaldean Syro-Maronite, and Syro-Malabaric. Syrian is the liturgical language of those places where the liturgy of St. James is used in celebrating mass. It is claimed to be the same language as that used by Christ and his apostles. The *Pure-Syrians* have a patriarch who resides in Mardin, but is styled "Patriarch of Antioch of the Syrians." They have, also, three archbishops and six bishops. About fifty-two thousand Catholics use this rite. They are the remnants of the primitive Syrian Church, which never separated from the Holy See.

The *Syro-Chaldaic* is a language peculiar to Babylonian Catholics, who are chiefly converts from Nestorianism, and dwell in Mesopotamia, Armenia and Kurdistan. They have a patriarch entitled "Patriarch of Babylonia of the Chaldees," but who resides at Mosul and Bagdad. They have, also, two archbishops and ten bishops. About fifty thousand Catholics belong to the Syro-Chaldaic rite. All the liturgical books of these people are written in the Chaldaic, in that peculiar character known as the "Estrangelo"; for the Chaldaic, it may be remarked, has 18 different alphabets.

The *Syro-Maronites* use unleavened bread for confecting the Holy Eucharist; and, like the rest of the Orientals, communicate the laity under both kinds, except that in communicating the sick only the species of bread is used. They use incense at low mass as well as at high mass, and read the Gospel in Arabic after it has been read in Syriac, Arabic being the vulgar language in those countries where

this rite prevails. Their secular clergy number about one thousand, and their regular clergy, or monks, about fourteen hundred. The monks are not married. The greater number of Maronites are in Lebanon, where their patriarch resides, though he is styled "Patriarch of Antioch of the Maronites." Maronites are found, also, in Syria, Egypt, Tripoli and Cyprus. Besides the patriarch, they have six archbishops and three bishops. About five hundred thousand Catholics follow the Maronite rite. One peculiarity of their government is that the people elect the patriarch, who, however, must await the confirmation of the Pope before he is installed in office.

The *Syro-Malabaric* rite had until lately no regular hierarchy, though the Catholics number about three hundred thousand. They depended on two Latin vicars apostolic, one living in Trichoor, the other in Cottayan. Their priests, however, used their own liturgy, not the Latin one. In 1896, Pope Leo XIII gave them a hierarchy. Catholics of this rite are found chiefly in Malabar, on the west coast of India.

The various Oriental rites exist side by side, and not infrequently cover the same territory. In several instances bishops of different rites reside in the same city, both being in communion with Rome. The same may be said of the Latin and the Oriental rites, both mutually giving respect and avoiding interference. There is a movement at present for a reunion of other churches with that of Rome; and the better to examine matters connected therewith, and promote this desirable object, a special "Congregation or Commission for the Reunion of Dissident Churches" was established in Rome in 1895, by Pope Leo XIII.

J. Cardinal Gibbons.

ROMAN DE LA ROSE. See France, Vol. IX, p. 568.

ROMANES, George John, a British biologist, was born in Kingston, Ontario, Canada, May 20, 1848. He was educated at Cambridge, England, the bent of his studies drawing him to natural science, and, later on, to the exposition of evolution in the field of psychology. Early in his career he gained reputation as an investigator and writer in biology, and became intimate with Charles Darwin. For a time he was professor of physiology at the Royal Institution and lecturer on natural history at the University of Edinburgh. In 1890 he removed to Oxford, where he founded the Romanes Lectures. In 1879 he was elected a fellow of the Royal Society, and was also a member of the Linnæan Society. In 1881 he published *Scientific Evidences for Evolution*, an epitome of the testimony for evolution, which he succinctly presented in four series of arguments—from classification, or the affinities of animals and plants; from their geological succession; from their geographical distribution; and from embryology. He contributed the article on Hybridism (see Vol. XII, pp. 437–442) and Instinct (see Vol. XIII, pp. 164–166), to this Encyclopædia. His chief writings embrace *A Candid Examination of Theism* (1878); *Animal Intelligence* (1881); *Organic Evolution* (1882); *Mental Evolution in Animals* (1883); *Jelly-Fish, Star-Fish, and Sea-Urchins* (1884); *Mental Evolution in Man* (1888); *Origin of the Human Faculty and Philosophy of Natural History before and after Darwin* (1892). *An Examination of Weismannism*, comprising theories of heredity and evolution, appeared posthumously in 1896. Another posthumous volume, a collection of *Essays*, appeared in 1896, together with *Selections from His Poems*. Mr. Romanes for a time discarded the theory of intelligent design in his writings, as supernatural, and against that logic which forbids us to assume the operation of higher causes when lower ones are sufficient to produce the effect. Shortly before his death he publicly renounced his position as an opponent of teleology and the supernatural, as his *Thoughts on Religion* (1895), edited by Canon Gore, and the *Life and Letters of Romanes*, edited by his wife (1896), disclose. He died at Oxford, May 23, 1894.

ROMANESQUE. See *Pointed Architecture*, under Architecture, Vol. II, p. 369.

ROMANO, Giulio. See Pippi, Vol. XIX, p. 121.

ROMANOFF. See Russia, Vol. XXI, pp. 104–111.

ROMANSCH. Same as Ladino. See Romance Languages, Vol. XX, p. 686.

ROMANTICISM. See France, Vol. IX, p. 597; Germany, Vol. X, pp. 483–485; and Rossetti, Vol. XX, pp. 880–883.

ROMANY LANGUAGE. See Gipsies, Vol. X, pp. 547–549.

ROME, a city and the capital of Floyd County, northwestern Georgia, 60 miles S. of Chattanooga, Tennessee, on the Coosa River, and on the Southern, the Nashville, Chattanooga and St. Louis and the Chattanooga, Rome and Columbus railroads. It is situated picturesquely in a rich agricultural region. The city has a large trade in grain, cotton, grass and lumber, and is at the head of navigation. It is the seat of two colleges for women, has a fine water-power, manufactures lumber, iron and machinery, and has cotton-compressing works. It also has an infirmary, banks, public parks and an electric-lighting plant. Population 1900, 7,291.

ROME, a city of central New York. It is on the Rome, Watertown and Ogdensburg, the New York, Ontario and Western and the New York Central and Hudson River railroads, and on the Mohawk and Black rivers. The city is laid out with considerable regard to beauty of location, and is in all respects attractive. The streets are well lighted by electricity, are regular, and the principal ones are one hundred feet wide. It also has a good water-supply, taken from the river. It has good public schools, St. Peter's Academy (Roman Catholic), two libraries and several banks, one a savings bank with deposits of over $2,000,000. The manufacturing industries embrace locomotive-works, iron-works, factories for the production of furniture, machinery, hardware, specialties and trimmings, cigars, cement, glue, saddlery, harness, wire, etc.; has, also, saw and grist mills, gas-works, creameries and

dairies and canning-works. Population 1890, 14,991; 1900, 15,343. See also ROME, Vol. XX, p. 860.

ROMEO, a village of Macomb County, southeastern Michigan, 30 miles N. of Detroit, on the Grand Trunk railroad. It is in an excellent farming region, and has manufactories of door-hangers, carriages and road-carts, iron castings, farm tools, steam-engines, flour and lumber. Population 1890, 1,687; 1900, 1,580.

ROMESCOT. See PETER'S PENCE, in these Supplements.

ROMILLY, JOHN, BARON. See ROMILLY, SIR SAMUEL, Vol. XX, p. 861.

RONCADOR REEF, a partially hidden bank in the Caribbean Sea, in lat. 13° 34′ N , and long. 80° 5′ W. It was on this reef that the United States warship *Kearsarge* was wrecked, Feb. 10, 1894. See also KEARSARGE, and WINSLOW, JOHN ANCRUM, in these Supplements.

RONCESVALLES. See ROLAND, LEGEND OF. Vol. XX, p. 641.

RONGE, JOHANN, a leader of a German Catholic movement (1813–87). See GERMAN CATHOLICS, Vol. X, p. 399.

RÖNTGEN, WILHELM KONRAD, a German physicist; born at Lennep, near Düsseldorf, Mar. 27, 1845. He studied at Zurich under Kundt, and became, in 1870, assistant of Kundt at Würzburg. In 1872 he went with Kundt to Strasburg, where he, in 1874, established himself as academic teacher. After he had held a professorship at the Academy of Hohenheim (Würtemberg) for a short time, he, in 1876, became professor-extraordinary of physics at the University of Strasburg, and, in 1879, professor-ordinary of physics at the University of Giessen. In 1888 he was appointed to the same professorship at the University of Würzburg, and was, in 1899, called to the University of Munich. His experimental works, published in *Annalen der Physik und Chemie*, treat, among other subjects, on the accurate determining of the relation of heat to atmosphere; on the change of solid contents and of birefraction of dielectrics by the aid of electrification; on the condensibility of fluids, and on the influence of pressure on some physical properties. He became, however, famous in 1896 by the discovery, in 1895, of the X rays—called so by himself, but since known under the name of Röntgen rays. For his discovery, which he described in his work *Ueber eine neue Art von Strahlen* (Würzburg, 3 vols., 1896–97), he was, in 1901, awarded the Nobel prize for physics. The discovery, treated in the article ELECTRICITY, resulted in many inventions embodied in its principles, like the cryptoscope (see in these Supplements) and the orthodiagraph. In surgery the Röntgen rays have proven of great diagnostic value; the bones forming the principal object by their great content of an organic substance. By their aid it is easy to follow up the healing process of fractures, to fix on a photographic plate the seat of a sprain, tuberculosis, periostitis, syphilis, sarcoma and cancer of the bones, and to localize foreign bodies in the human frame. In medicine the rays are used as accessory to percussion and auscultation in diagnosing ailments of the lungs, the diaphragm and the heart. They also have proven of therapeutical value in the treatment of lupus, eczema and cancer of the skin. G.A.S.

PROFESSOR RÖNTGEN.

RÖNTGEN RAYS OR ROENTGEN RAYS AND PHOTOGRAPHY. See ELECTRICTY, § 96, and PHOTOGRAPHY, in these Supplements.

ROOD, OGDEN NICHOLAS, an American scientist; born in Danbury, Conn., Feb. 3, 1831. He graduated at Princeton College in 1852, and studied at the Universities of Munich and Berlin from 1854 to 1858. In the latter year he became professor of chemistry and physics at Troy University and held that position until 1863, in which year he took the chair of physics at Columbia College. He was the first to apply stereoscopic photography to the microscope, and the first to make quantitative experiments on color-contrasts, to measure the duration of flashes of lightning, and to make a photometer that is independent of color. He is the author of *Modern Chromatics* and of a large number of scientific papers. He died in New York, Nov. 12, 1902. E.E.T.

ROODHOUSE, a city of Green County, western Illinois, 55 miles N. of St. Louis, on the Chicago and Alton and the Chicago, Burlington and Quincy railroads. It is in a truck and grain raising region, and contains flour-mills, grain-elevators, stock-yards, railway shops, water-works, banks and papers. Population 1900, 2,351.

ROOD-SCREEN. See ARCHITECTURE, Vol II, p. 415.

ROOF. See BUILDING, Vol. IV, pp. 433, 449–451. For groining, see ARCHITECTURE, Vol. II, p. 375.

ROON, ALBRECHT, COUNT VON, a Prussian field-marshal-general; born near Kolberg, April 30, 1803. He studied at the General War Academy of Berlin, and was from 1828–44 teacher of geography and tactics at the school of cadets. He attained all ranks in the army till he, in 1859, became lieutenant-general. In the same year he was appointed minister of war, in which capacity he effected a modern military organization for the "nation under arms." Its wonderful efficiency became manifest in the campaigns of 1864, 1866 and 1870–71. In 1871 he was created a hereditary duke and in 1873 a field-marshal-general and president of the war cabinet. He retired the same year and died at Berlin, February 23, 1879. He wrote *Die Grundzüge der Erd-Völker-und Staaten Kunde* (1833); *Militärische Länder-Beschreibung von Europa* (1837). G.A.S.

ROOPNA-RAYAN OR DALKISSORE, a river

of Bengal. See DALKISSORE, in these Supplements, p. 980.

ROOSEVELT, THEODORE, twenty-sixth President of the United States. He was born in New York city, Oct. 27, 1858. He graduated at Harvard in 1880; and has received several honorary degrees. He was a member of the New York legislature, 1882–84; delegate to the National Republican Convention in 1884; unsuccessful Republican candidate for mayor of New York, 1886; national civil service commissioner, 1889–95; president of the New York police board, 1895 to 1897; and assistant-secretary of the navy from 1897 to 1898; lieutenant-colonel, and later colonel, of Rough Riders in 1898; and governor of New York in 1899. A thorough student, he has published many valuable historical works, notably *History of the Naval War of 1812* (1882); *Life of Thomas H. Benton* (1887); *Life of Gouverneur Morris* (1888); *Historic Towns: New York* (1891); *Winning of the West* (1889–95). An indefatigable sportsman, he spent much of his time on his ranch in North Dakota, leading the rough and typical life of the frontiersman, and publishing the results of his experience and study in *Hunting Trips of a Ranchman* (1883); *Ranch Life and the Hunting Trail* (1888); and *The Wilderness Hunter* (1893). Always active in politics, he worked vigorously in every field from the primary to the assembly chamber; at all times a reformer, devoted to the enforcement of laws and the abolition of abuses, he personally investigated the evils of New York politics and legislation, and strove not only to utilize the good of existing statutes, but to turn public attention to their bad qualities. His attitude on the liquor law in New York city was characteristic of his methods and belief. As a member of the Civil Service Commission he did much to extend the scope of its influence and to bring within its rules many classes of public employees which had formerly been exempt from their operation. As president of the New York Police Board he uprooted much of the dead timber in the force, and introduced new and younger material, better fitted both physically and morally for the work. As assistant secretary of the navy he wrought vigorously for its rehabilitation and improvement; and to him is largely due the credit for the fleets' excellent work in the Spanish war. Largely instrumental in the organization of the Rough Riders, famous in that war, he declined the offer of a colonelcy therein from a consciousness of lack of experience for the position, putting forward his friend, Dr. Leonard Wood, for the post of honor, and accepting for himself the lieutenant-colonelcy. In all the actions in which his regiment was engaged he was a fearless leader, a hero and a friend to his men, and a bold instigator of movements looking to the welfare of the army and the honor of the flag. He led his men at Las Guasimas, El Caney, and San Juan Hill; was a signer, if not the originator of the famous "round robin," was always ready for any emergency, and was actively concerned in all the measures for the restoration to health of the sick and wounded at Camp Wikoff. He was elected governor of New York in November, 1898, largely by reason of his military achievements, and also on account of popular belief in his personal integrity and political soundness. For the latter reason, especially, he was nominated in 1900 for the Vice-Presidency of the United States on the Republican ticket, cotemporary with William McKinley for President. His mental alertness and vigorous personality, together with his known probity and frank sincerity, commended him for the office. In the autumn of 1900 he made a western tour, evoking great enthusiasm by his vigorous campaign for the platform and ticket. In all his speeches he exhibited his usual force and energy. After the tragedy at Buffalo, Mr. Roosevelt was sworn in as Chief Magistrate, Sept. 14, 1901, to fill the unexpired term of President McKinley. On taking the oath of office, he announced his purpose to continue absolutely unbroken the policy of his lamented, martyred predecessor. His official course and ability in dealing with affairs of state indicated the wisdom of continuing him in the Presidency, for which he was unanimously nominated by the Chicago National Republican Convention, June 23, 1904, and was elected the next November by an immense majority. *Revised by* R.C.A.

THEODORE ROOSEVELT.

ROOT, ELIHU, an eminent New York lawyer, born at Clinton, N. Y., Feb. 15, 1845, graduated at Hamilton College in 1864, studied law and was admitted to the bar in 1867. He gained especial distinction as a corporation lawyer. He was U. S. District Attorney in New York City from 1883 to 1885. In 1889 he was appointed by President McKinley to succeed Russell A. Alger as Secretary of War and continued in the position under President Roosevelt until Feb., 1904, when he resigned and resumed law practice in New York City. A.R.R.

ROOT, GEORGE FREDERICK, musician; was born at Sheffield, Massachusetts, on August 30, 1820; was associated with Lowell Mason in the introduction of musical instruction into common schools, and settled in New York as a teacher and choir-master in 1844. He wrote many popular songs, such as *There's Music in the Air; The Battle Cry of Freedom*, and many hymns; founded a music publishing house in Chicago, composed several cantatas and wrote instruction books, and died on August 6, 1895. W.F.J.

ROOT, JOHN WELLBORN, an American architect; born in Lumpkin Ga., Jan. 10, 1850, educated in Liverpool, England, and at the College of the City of New York. In 187- he formed a partnership with D. H. Burnham, which continued until Mr. Root's death, Jan 15, 1891. This firm erected notable buildings in many cities; developed the "Chicago construction" for high buildings; first used steel rails embedded in concrete for foundations, and first made use of the cantilever system for upholding old walls. In 1890 Mr Root was appointed consulting architect for the Columbian Exposition.

ROOTS OF PLANTS. See BOTANY, Vol. IV, pp. 83–84; PHYSIOLOGY, Vol. XIX, p. 53.

ROOT-TUBERCLES. See ECOLOGY, in these Supplements.

ROPE-MAKING MACHINERY. Only the larger sizes of ropes are now made in ropewalks, chiefly because the manufacturers possess the old mechanisms, and do not care to pay for improved machines for sizes for which the demand is not great. In the manufacture of hemp rope in the United States, the first machines used are for forming the slivers. The single-chain or drawing machine has a chain formed of linked bars studded with pins. A pair of fluted iron drawing-rolls draw the body of hemp on the chain into a sliver four or six times the original length. The double-chain or heckling machine has a second chain, moving faster than the first chain, for combing the hemp into slivers, all lying in the same direction. These machines are arranged in sets or series, and the hemp is run through from five to ten times, according to its quality or condition. A more recent machine for this work is the Montgomery breaker, resembling the breaker used in cotton-manufacture. It combs and straightens the hemp into slivers ready for spinning. This operation is performed on a special form of spinning-jenny, on which the sliver is drawn in on capstan-wheels, and formed into thread. It is delivered as yarn, on bobbins of about fifteen pounds each. These bobbins go to the rope machines, which consist of a former and a rope-layer. In the forming-machine the threads or yarn are led through a gauge-plate, which guides them to the capstan, on which the first strand is twisted, after which a right and left screw guides the rope back and forth on a reel. These reels then go to the laying-machine, which is of the same character as the forming-machine, only much larger, and here the strands go through a similar mechanism and are laid into rope. The variations in lay are obtained by the use of change-wheels, of varying speed, used in connection with the draw-off drums. Wire rope is made on wire-stranding and wire-closing machines, which resemble the former and layer above described. The wires in the stranding-machine are passed through apertures in rotating nozzle-plates, and then through a fixed closing-block or die, after which the strand is run on to the draw-off drums. The hempen core, which is used almost universally with wire rope, is drawn through a central hole, and the plates rotate so as to twist the wires around it spirally. The finished strands, being wound on wheels, are sent to the flyers of the closing-machine, which lays them up into rope in a manner similar to the formation of the strands.

ROPEWAY, CABLEWAY, OR WIREWAY, an elevated wire-rope system of transporting suspended cars or carriers, much used in new countries and mining regions on account of its economy in first cost and in operation. In mining operations on a mountain-side where the grade is greater than one in seven, it may be operated wholly by gravity, the descending loads drawing up those ascending. Trees or stout posts with cross-arms are used as points of support for the rope at distances varying from 140 to 2,000 feet. The carriers are hung from the rope by hangers or clips. Sometimes the rope is made stationary and the carriers are rolled along, but the better and more common method is to use an endless rope, carried over large horizontal sheaves at the ends of the route. To this rope the carriers are hung, with automatic devices for dumping their contents at the proper points. About two hundred feet a minute is deemed the best speed for the rope, and if the line is run by gravity the speed is regulated by a brake. Ropeways are used in many manufacturing plants, where the nature of the work or the separation of the buildings renders it convenient. When run by gravity they will carry material two or three miles at an expense of only three or four cents a ton.

Ropeways for passenger travel have been built in various places, though they are not common. One, at Brighton, England, crossing a gorge, sustains a car that carries twelve passengers. Its construction resembles a suspension-bridge. Towers on each side of the gorge sustain an upper cable hung over them in a graceful curve. Below is another cable, which maintains a horizontal line, being supported at short distances by small ropes connected with the upper cable. The car is hung from the lower cable, and is pulled back and forth by an endless rope driven by a steam-engine. The ropeway, though not suited to carrying heavy loads, is superior to the railway in that it does not interfere with the use of land over which it passes, and the cost of construction is no more where the land is uneven than where it is level.

ROPES, JOHN CODMAN, LL. D., American author, was born in 1836 at St. Petersburg, Russia, of American parents, and died at Boston, Mass., Oct. 28, 1899. A lawyer by profession, Dr. Ropes came to make a close study of the art of war, and was noted for the excellence of his histories of great military campaigns. His chief works are *The Army Under Pope* (Campaigns of the Civil War series); *The Story of the Civil War*, of which two volumes only have as yet appeared; *The First Napoleon; The Campaign of Waterloo*, and *An Atlas of Waterloo*. Dr. Ropes was an LL. D. of Harvard and member of the Massachusetts Historical Society.

RORQUAL. See WHALE, Vol. XXIV, pp. 553–54; and FINBACK-WHALE, in these Supplements.

ROSA, CARL AUGUST, musician; was born in Hamburg in 1843, and studied music at Leipsic and Paris. He made a concert and operatic tour in the United States in 1870–72, managing a fine company, and then settled in London in an effort to produce grand operas in English. He met with many discouragements in the metropolis, but was welcomed in other parts of the kingdom, and finally attained success in London. He married the famous singer, Euphrosyne Parepa (see ROSA, EUPHROSYNE PAREPA, infra), in 1867, and died in April, 1889. W.F.J.

ROSA, EUPHROSYNE PAREPA, operatic soprano; was born in Edinburgh, Scotland, in 1836, the daughter of a Roumanian father and English mother. She became an opera singer in 1855, and attained great success, ranking among the

best sopranos of her time. She came to America in 1865, and sang at Gilmore's great peace jubilee in Boston, and during several seasons in opera, and in 1867 was married to CARL ROSA (q. v., supra). She was personally much beloved for her character and disposition. She died in England in 1874. W.F.J.

ROSA, FRANCISCO MARTINEZ DE LA. See SPAIN, Vol. XXII, p. 375.

ROSACEÆ, one of the largest and most important of the dicotyledonous families. It is characterized by its alternate leaves, regular flowers, usually numerous stamens, and one to many pistils. The principal great divisions, often regarded as families, are the almond or plum tribe, the rose tribe and the pear tribe. It furnishes the most important fruits of temperate climates, such as the apple, pear, quince, peach, plum, cherry, strawberry, blackberry, raspberry, etc., besides the showy roses of cultivation.

ROSA MONTE, a mountain on the borders of the Swiss canton of Valais, and the Italian provinces of Novara and Turin, at the east end of the Pennine Alps; the second highest mountain in the Alps, having as its highest peak the Dufour Spitze. Altitude 14,970 feet.

ROSANILINE. See ANILINE, Vol. II, p. 44.

ROSA OF LIMA OR ISABEL FLORES, the only canonized person of American nativity. See PERU, Vol. XVIII, p. 688, note.

RÖSCHER, WILHELM. See POLITICAL ECONOMY, Vol. XIX, pp. 404–415.

ROSCIUS QUINTUS. See DRAMA, Vol. VII, p. 356.

ROSCOE, SIR HENRY ENFIELD, an English scientific writer, grandson of Roscoe the historian; born in 1833, and educated at London and Heidelberg. He was professor of chemistry at Owens College from 1858 to 1886, and is distinguished chiefly for his investigations and discoveries relative to the chemical action of light and to the metal vanadium. In conjunction with Professor Schorlemmer he published a well-known *Treatise on Chemistry*. He also wrote *Lessons in Elementary Chemistry*, which has been translated into many languages; *Lectures on Spectrum Analysis; Chemistry Primer;* and published numerous articles and lectures in magazines. He became president of the British Association in 1887; was made an officer of the Legion of Honor in recognition of his services as a vice-president of the Paris Exposition; and in the same year was chosen president of the Midland Institute, Birmingham. He sat for South Manchester as an advanced Liberal in 1885, and was re-elected in 1886 and 1892.

ROSE. For general article, see ROSE, Vol. XX, pp. 873–874; and also HORTICULTURE, Vol. XII, p. 269.

ROSE, HEINRICH, a German chemist; born at Berlin, August 6, 1795. He studied at Berlin, in 1819 at Stockholm under Berzelius, and in 1821 at Kiel. In 1823 he became professor extraordinary, and in 1835 professor ordinary of chemistry at Berlin. Since 1832 a member of the Academy of Sciences; he died Jan. 27, 1864. Rose was one of the foremost of Berzelius' scholars and must be called the founder of modern analytical chemistry. In 1844 he discovered niobium. His principal work is *Handbuch der Analytischen Chemie* (1829; 6th edition, 1864–71). G.A.S.

ROSE, MARIE. See MAPLESON, MRS. MARIE ROSE, in these Supplements.

ROSE ACACIA, the common name of *Robinia hispida*, a plant of the family *Leguminosæ*. It is an ornamental shrub, with bristly branches, broad leaflets, large, showy rose-colored flowers in racemes, and bristly pods. Its well-known congener is the common locust (*R. pseudacacia*).

ROSE-APPLES, the common name of *Eugenia jambos*, a plant of India, belonging to the myrtle family. It has opposite and long, shining leaves, clusters of large white flowers, with conspicuous long stamens, and a large edible berry like a small apple.

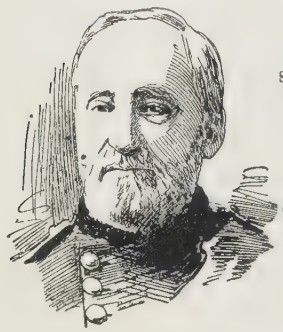
ROSEBERY, FIFTH EARL OF, ARCHIBALD PHILIP PRIMROSE, statesman and author; was born in London on May 7, 1847, and was educated at Eton and Cambridge. He succeeded his grandfather as earl in 1868, and early began to take an active interest in public affairs. In 1874 he was president of the Social Science Congress, and lord rector of Aberdeen University in 1878, and of Edinburgh University in 1880. From 1881 to 1883 he was under secretary for the Home Department under the Gladstone government, and in 1884 became first commissioner of works. In July, 1886, and 1892–94 he was Gladstone's secretary of state for foreign affairs; in 1889–90 and 1892 he was chairman of the London county council, and in 1894–96 was prime minister of England. In 1878 he married Hannah Rothschild, only daughter of Baron Meyer de Rothschild, and in 1894 and again in 1895 won the famous Derby horse race. Thus was fulfilled the ambition which he is said to have expressed in his college days, that he might win the Derby, marry an heiress, and be prime minister. Although a close friend of Mr. Gladstone, and chosen by the latter to be his successor, Lord Rosebery has never been in full sympathy with the Liberal party, and at his retirement from the premiership was practically deposed from its leadership. He is an earnest advocate of "imperial federation," has repudiated Irish home rule, and in foreign affairs has pursued a vigorous policy. He has paid much attention to letters, and has written admirable lives of the younger Pitt and of Peel, and *The Last Phase*, a study of Napoleon's closing years. W.F.J.

LORD ROSEBERY.

ROSEBURG, Oregon, the seat of Douglas County, a city on the Umpqua River, and on the Portland and Redding, Cal., division of the

Southern Pacific Company railroad, 200 miles south of Portland. It is the seat of the Oregon Soldiers' Home, and is the market center of an extensive farming and stock-raising region, with milling and mining industries. Population, 1890, 1,472; 1900, 1,690. C.L.S.

ROSECRANS, WILLIAM STARKE, soldier; was born at Kingston, Ohio, on September 6, 1819, and was graduated from West Point in 1842. He entered the artillery service, was engaged on the fortifications at Hampton Roads, was a professor at West Point, and was superintending engineer at Fort Adams, Newport, and surveyor at the Washington navy yard. In 1855 he resigned his commission and went into private business, but at the beginning of the Civil War returned to the army. He served under McClellan in West Virginia, and in July, 1861, succeeded him in the command of the Department of the Ohio. There he did effective work at Rich Mountain, Cheat Mountain, and Carnifex Ferry, and received the thanks of the West Virginia and Ohio legislatures. After much important survey work and other campaigning he won the battles of Iuka and Corinth, in the fall of 1862, and was then put in command of the Department of the Cumberland. He made headquarters at Nashville, won the great battle of Stone River, for which he received the thanks of Congress, and invaded Alabama and Georgia. In the battle of Chickamauga, on September 19 and 20, 1863, he narrowly escaped destruction, and a month later he was relieved of his command, but afterward served in Missouri. Afterward he was minister to Mexico and a representative in Congress. He died on March 11, 1898. W.F.J.



GEN. W. S. ROSECRANS.

ROSELLY DE LORGUES, ANTOINE FRANÇOIS FÉLIX, a French religious writer; born in Grasse, Aug. 11, 1805; was authorized, in 1860, to add de Lorgues to his name. He studied law, but gave it up for the study of religious questions and philosophy; received the cross of the Legion of Honor in 1837, and was made an officer in 1855. His writings include *Le Christ Devant le Siècle* (1835); *De la Femme et du Serpent* (1842); *La Croix dans les deux Mondes* (1844); *Christophe Colomb* (1856), and *Histoire Posthume de Christophe Colomb* (1885).

ROSE-MALLOWS. See INCENSE, Vol. XII, p. 757.

ROSENKRANZ, KARL, a German philosopher and historian of literature; born at Magdeburg, April 23, 1805. He studied at Berlin, Halle and Heidelberg; became, in 1831, professor at Halle, and held a professorship of philosophy at Königsberg from 1833 to the time of his death, June 14, 1879. He was a very versatile writer, and tried to introduce the ideas of Hegel's system into all spheres of literature and life. His works include *Encyclopädie der Theologischen Wissenschaften* (1831); *Studien* (1832–47); *Psychologie und Wissenschaft vom Subjectiven Geist* (1837); *Wissenschaft der Logischen Idee; Neue Studien* (1875–78). He also published Hegel's *Leben*, and with Schubert, a complete edition of Kant's works. G.A.S.

ROSENTHAL, MORIZ, an Austrian pianist; born in Lemberg, Dec. 18, 1862. He studied under Mikuli, and gave his first concert at Vienna in 1876; was appointed pianist to the Roumanian court in 1878; created a sensation by his playing in St. Petersburg and Paris; has played in all the countries of Europe, but deferred his visit to England until 1895, when he made an immediate success. In 1898–99 he played in the United States.

ROSE OF JERICHO OR ROSE OF THE VIRGIN. See ROSE, Vol. XX, p. 874.

ROSE OF SHARON, a popular name for *Hibiscus Syriacus*, a plant of the mallow family and well known as the common Althæa of gardens. See also ALTHÆA, in these Supplements.

ROSEOLA OR GERMAN MEASLES. See MEASLES, Vol. XV, p. 665.

ROSES, WARS OF THE. See ENGLAND, Vol. VIII, p. 293.

ROSLYN, a residence village of southeastern New York, on Long Island, at the south end of Hempstead Harbor, 23 miles E.N.E. of Brooklyn, on the Long Island railroad. It has a classical school, and flour, planing and paper mills and a canning factory. The village was named by William Cullen Bryant, who had a residence there. Pop. 1890, 1,251 (1900 included in Greater N.Y.).

ROSLYN, a town of Kittitas County, central Washington, 26 miles N.W. of the county seat, Ellensburg, on the Union Pacific railroad. Its main occupation is coal-mining, as it produces about two thousand tons per diem. Population 1890, 1,484; 1900, 2,786.

ROSNY, LÉON, a French Orientalist and ethnographer; born Aug. 5, 1832, at Loos; in 1868 professor of Japanese language and literature at Paris. He, in 1859, founded the Société Orientale et Américaine, and organized the international congresses of Orientalists. Among his works are *Études Asiatiques* (1864); *Eléments de la Grammaire Japonaise* (1873); *A Grammar of the Chinese Language* (1874); *Interprétation des Anciens Textes Mayas* (1875); *Les Documents Écrit de l'Antiquité Américaine* (1882); *Codex Cortesianus* (1883); *Taureaux et Mantilles* (1894). G.A.S.

ROSOLIC ACID, trioxy-diphenyl-tolyl-carbinol anhydride ($C^{20}H^{16}O^3$), is formed by treating rosaniline with nitrous acid. It is a phenol dye-stuff dissolving in alkaline solutions with red color, and is known by the trade-name of methylanrine. It is also used as an indicator in the laboratory.

ROSS, ALEXANDER MILTON, naturalist; was born in Ontario, Canada, in 1832, and became a physician in New York. In the Civil War he was an army surgeon. In 1866 he returned to

Canada and engaged in zoölogical and botanical pursuits. In 1881 he helped to found the Society for the Diffusion of Physiological Knowledge. He was the author of *Recollections of an Abolitionist* (1867); *Birds of Canada* (1873); *Mammals, Reptiles and Fresh-Water Fishes of Canada* (1878); *Flora of Canada* (1873), and other works. He died in Oct., 1897. W.F.J.

ROSS, JONATHAN, lawyer; was born at Waterford, Vermont, on April 30, 1826, and was graduated from Dartmouth College in 1851. In 1856 he was admitted to the bar, was a member of the Vermont assembly in 1865–67, and of the state senate in 1870. He was also a state's attorney, a member of the state board of education, and a member of the last council of censors, in 1869. He was a justice of the Vermont supreme court in 1870–90, and chief-justice in 1890–1900. In Jan., 1899, he was appointed U. S. Senator from Vermont, to fill the vacancy caused by the death of Justin S. Morrill, and in 1900–02 he was chairman of the state railroad commission. W.F.J.

ROSSE, LAURENCE PARSONS, EARL OF, a British astronomer; born at Birr Castle, King's County, Ireland, Nov. 17, 1840. He succeeded to his father's title in 1867; was educated at Trinity College, Dublin, and at Oxford; was chancellor of Dublin University, and one of the Senate of the Royal University of Ireland; was elected president of the Royal Dublin Society in 1887, and published numerous articles on various scientific subjects.

ROSSETTI, CHRISTINA GEORGINA, poet; sister of Maria Francesca, Dante Gabriel and William Michael Rossetti; was born in London, England, on December 5, 1830, was well educated and exhibited precocious powers, her first poem being printed in 1842. In 1847 her first volume of verse appeared, and in 1850 she began contributing to her brothers' periodical, *The Germ*, under the pen-name of Ellen Alleyne. Her first important volume was *The Goblin Market and Other Poems* (1862), which was followed with *The Prince's Progress* (1866); *Commonplace* (stories, 1870); *Sing-Song* (1872), and *A Pageant* (1881). A number of her poems were published as *New Poems* in 1896. Her health for years was poor, and a morbid strain appears in nearly all of her writings, with the possible exception of the *Goblin Market*. She was an ardent Italian patriot, and for that reason declined to enter the Roman Catholic Church, but instead found refuge in extremely "high" Anglicanism, and devoted much time to worship and to charitable works. Upon these religious grounds she was estranged from a lover to whom she was deeply attached, and that circumstance also tinctured many of her poems with the hues of disappointed and hopeless love. She died of cancer, after a long illness, in London, on December 29, 1894. W.F.J.

ROSSETTI, MARIA FRANCESCA, sister of Christina G., Dante G. and W. M. Rossetti; was born in London on February 17, 1827, and was the most practical and normal member of the family. She wrote some Italian text-books and religious works, entered a religious sisterhood in 1874, and died on November 24, 1876. W.F.J.

ROSSETTI, WILLIAM MICHAEL, poet and art-critic, brother of Dante Gabriel and Christina Georgina Rossetti; was born in London, Sept. 25, 1829, and educated at King's College School, London. Mr. Rossetti, who long held a post in the English civil service, came to notice as a critic of fine art and literature in 1850. He was much engaged (together with his brother, Millais, Holman Hunt, Woolner and others) in "Pre-Raphaelite" art from its commencement in 1848; and he edited and wrote for *The Germ*, a magazine conducted by the Pre-Raphaelites in 1850. He published *Dante's Comedy, the Hell* (translated into blank verse, 1865); *Fine Art, Chiefly Contemporary* (1867), a volume of republished criticisms; an edition of *Shelley's Poetical Works* (1870; revised edition, 1878), with a memoir and a large body of notes; *Lives of Famous Poets* (1878), being brief biographies of British poets, from Chaucer to Tennyson, some of them reproduced from the series named *Moxon's Popular Poets*, with others added; an edition of the *Collected Works of Dante Gabriel Rossetti* (1887); a *Life of Keats* (1887), in the series of *Great Writers;* and *Dante Gabriel Rossetti as Designer and Writer* (1889). He also edited, with a memoir, *William Blake's Poems*, in the Aldine series; and in 1868 issued a selection from the *Poems of Walt Whitman.* Among his other works are a poem of modern life, *Mrs. Holmes Grey* (1869); and a *Criticism of Swinburne's Poems and Ballads* (1866). Mr. Rossetti delivered in 1875 a series of lectures on *Shelley's Life and Poems*, and on *The Wives of Poets.* In 1890 he published a copiously annotated edition of Shelley's *Adonais* in the Clarendon Press series; also editions at various times of Coleridge, Campbell, Keats, and Milton; also *Dante Gabriel Rossetti: His Family Letters* (1896). He also edited a collection of his sister, *Christina Rossetti's Poems* (1896). He wrote the article on SHELLEY, in this ENCYCLOPÆDIA (Vol. XXI, pp.826–31), and more than a score of other articles, most of them treating of Italian painters.

ROSSI, ERNESTO, actor and author; was born at Leghorn, Italy, in 1829, and was educated for the bar. Instead, he turned his attention to the drama, and in 1853 was associated with Ristori. He organized a company of his own in Italy, with much success, and also appeared in other countries, playing an Italian version of *Le Cid* at the Théâtre Français in Paris. He gave a series of Shakespearian plays in London, and was also seen in the United States in 1881. He was the author of a number of plays, including *Adela*, written for Ristori; *The Hyenas*, a social comedy, and *The Soldier's Prayer;* also a treatise on *Hamlet; Dramatic Studies; Forty Years of Artistic Life*, and a romance, *Niccolai.* He died in Italy in June, 1896. W.F.J.

ROSSITER, STEALY B., clergyman; was born at Berne, New York, in 1846, and was graduated from Union College in 1865, and Union Theological Seminary in 1869. He entered the ministry

of the Presbyterian Church at Elizabeth, N. J., and for twenty-seven years was pastor of the North Presbyterian Church in New York city. Since 1897 he has been secretary of the American McAll Association, allied with the McAll Missions in France. He is the author of *The Red Cord* and other works. W.F.J.

ROST, Pierre Adolphe, soldier and jurist; was born in France in 1797, became a law student, and served in the army. After Waterloo he came to America; settled in Louisiana; was a state senator in 1822; a justice of the state supreme court in 1838, and again in 1846–52. He was one of the three Confederate commissioners to Europe in 1861, and a special commissioner to Spain in 1862, but found his errands fruitless. He died on September 6, 1868. W.F.J.

ROST, Reinhold, Orientalist; was born at Eisenberg, Germany, on February 2, 1822, and was educated at Jena. He settled in England in 1847, was Oriental lecturer at St. Augustine's College, Canterbury, secretary to the Royal Asiatic Society, and librarian to the India Office. He edited a number of works on Sanskrit literature and other Oriental topics, and was the author of Siam: Language and Literature in this Encyclopædia. He died on February 7, 1896. W.F.J.

ROSTAND, Edmond, dramatist and poet; was born at Marseilles, France, in 1868. His works include *Les Romanesques* (1894); *La Princess Lointaine* (1896); *La Samaritaine* (1897), and *Cyrano de Bergerac* (1898). These are all dramas. His poems comprise *Les Musardises*, *Pour la Grece*, and *L'Aiglon* (1900). He was elected to the French Academy in 1901. W.F.J.

ROSTRA, platforms. See Rome, Vol. XX, p. 835.

ROT, a general name in plant pathology, applied to the diseases which follow the attacks of parasitic fungi, as bitter-rot of apples, black-rot and other rots of grapes, potato-rot, plum-rot, tomato-rot, root-rot, dry-rot of timber, etc.

ROTARY MAGNETIC FIELD. See Electricity, § 89, in these Supplements.

ROTARY PRESSES. See Typography, Vol. XXIII, p. 754; and Presses, in these Supplements.

ROTARY TRANSFORMERS. See Electricity, § 77, in these Supplements.

ROTATION OF CROPS. See Agriculture, Vol. I, pp. 303, 304.

ROTATORIA, same as ROTIFERA. Vol. XXI, pp. 7–12.

ROTCH, Abbott Lawrence, an American meteorologist; born in Boston, Massachusetts, Jan. 1, 1861; entered the Boston Institute of Technology; founded at his own expense the Blue Hills Observatory, in Massachusetts, 1885; was associate editor of *The American Meteorological Journal* (1886–92); represented the United States at the Paris Exposition (1889); appointed chevalier of the Legion of Honor; member of the international meteorological committee on the classification and nomenclature of the clouds (1891). His observations made at the Blue Hill Observatory have been accepted all over the Eastern states.

ROTHROCK, James Harvey, jurist; was born at Milroy, Pennsylvania, on June 1, 1829, and was taken to Ohio in 1838. He was educated at Franklin University, New Athens, Ohio, was admitted to the bar, was prosecuting attorney of his county, and removed to Iowa in 1860. There he was a member and speaker *pro tem.* of the state assembly in 1861, served as a volunteer officer in the Civil War and led a desperate charge at Vicksburg, was elected to the district court bench in Iowa in 1866, and ten years later was appointed to the supreme bench, serving there for twenty-three years. He died on January 14, 1899. W.F.J.

ROTHSCHILD, a notable Jewish family, prominent in finance and politics. For some account of the earlier members, see Rothschild, Vol. XXI, p. 7. W.F.J.

ROTHSCHILD, Alfred Charles de, was born in London, England, on July 20, 1842, son of Baron Lionel de Rothschild, and was educated at King's College, London, and Trinity College, Cambridge. He has been a director of the bank of England, and a trustee of the national gallery. He is one of the foremost collectors of pictures, china, furniture, etc., in England, and has published two volumes of richly illustrated catalogues of his collections. W.F.J.

ROTHSCHILD, Lionel Walter, son and heir of Baron Nathan Mayer Rothschild; was born in London on February 8, 1868, and has devoted himself to mercantile affairs and to zoölogical researches. He has been a trustee of the British Museum since 1899, and has published *Avifauna of Laysan* and numerous magazine articles, and is one of the editors of *Novitates Zoölogicæ*, published at the Zoölogical Museum. W.F.J.

ROTHSCHILD, Nathan Mayer, Baron Rothschild, was born in England on November 8, 1840, a son of Lionel Nathan Rothschild, who was the first Jew elected to the House of Commons, and who was the means of Jewish enfranchisement in England. He was educated at Trinity College, Cambridge, and was a Liberal member of the House of Commons for Aylesford from 1865 to 1885. In the latter year he was elevated to the peerage as Baron Rothschild, of Tring Park, Hertfordshire. He has been lord lieutenant for Buckinghamshire since 1889. He possesses a notable art collection, and is an extensive landowner, holding more than 15,000 acres. W.F.J.

ROTTENSTONE. See Geology, Vol. X, p. 207.

ROTTERDAM, the second largest city and the commercial center of the Netherlands, and the capital of South Holland. The trade of Rotterdam has in recent years grown rapidly. In 1888 the quays measured 15 miles in length, and the docks covered an area of 190 acres. Since then other docks have been made and wharves extended. The new waterway of the

Hook of Holland, first used by ocean steamers in 1872, has been deepened to over 22 feet, and vessels have ceased to approach the city by the old channel. In 1899 it was estimated that, taking all the vessels that entered all the ports of Holland from abroad, more than 70 per cent (tonnage) entered at Rotterdam. The net tonnage of the vessels (which numbered 6,036 in 1899) so entering doubled between 1875 and 1890, and was in the latter year eight times what it was in 1880. To this foreign trade should be added 84 per cent. of the total trade between Germany and Holland by the way of the Rhine and a traffic carried on the canals and streams. If all these items be put together, the total tonnage of vessels entering Rotterdam in 1899 amounted to 5,813,034 tons, a figure that was only excelled by London among European ports. The figures quoted do not include the returns of the fishing-fleet, which sold in Rotterdam in 1890 fish to the value of $95,000. The merchant fleet of Rotterdam itself numbered in 1890 86 vessels of 117,208 tons. In 1899 the total tonnage of vessels entering and clearing Rotterdam was 8,104,142 tons, or about seventy per cent of the carrying trade of the Netherlands. Rotterdam sends to the Dutch Eastern possessions and to the West Indies provisions, spirits, wines, mineral waters and manufactured goods, in return for coffee, sugar, spices, cotton, dye-woods, etc. To England and Scotland, with which it carries on an extensive and lucrative trade, it sends cheese, butter, flax, madder, seeds, fruits, ducks, and large numbers of sheep and cattle. With America and with France, Spain, Portugal and the northern states of Europe it has also a considerable trade. Along the Rhine it sends to Germany and Switzerland sugar, coffee, cotton, butter, cheese, dye-woods, indigo, spices, Dutch tobacco, rape-seed, madder, fish, etc., in return for wheat, rye, Moselle and Rhine wine, pipe-clay, pottery ware, chemical stuffs, etc. Rotterdam has distilleries, windmills and sugar-refineries, besides important manufactures of iron, soap, sail and hair cloths, cigars, vinegar, liquors and jewelry. It is a very important market-center for tobacco, coffee, grain, indigo and petroleum. Population 1900, 332,185. For general description, see ROTTERDAM, Vol. XXI, pp. 13–15.

ROUBLE OR RUBLE. See MONEY, Vol. XVI, p. 758.

ROUDAIRE, ELIE, (1836–85), a French engineer. See SAHARA, Vol. XXI, p. 159.

ROUGÉ, OLIVER CHARLES CAMILLE EMMANUEL, VICOMTE DE, a French Orientalist; born in Paris, April 11, 1811. He devoted himself to Oriental studies, particularly to Hebrew, Arabic, and Coptic, and finally to Egyptology exclusively. In 1849 he became keeper of Egyptian antiquities in the Louvre, and was the first to attempt the translation of long Egyptian texts from papyrus. He became member of the French Institute in 1853 and professor of Egyptology in the Collège de France in 1860. He is credited with the discovery of the Egyptian doctrine of immortality. One of his published works traces our modern alphabet through the Greek and Phœnician back to an Egyptian source. Among his historical works is *Recherches sur les Monuments qu'on peut attribuer aux Six Premières Dynasties de Manéthon* (1866); and upon Egyptian religion and mythology: *Explication d'une Inscription Égyptienne, prouvant que les Anciens Égyptiens ont Connu la Génération du Fils du Dieu* (1851). He died in Bois Dauphin, Dec. 31, 1872.

ROUGE-ET-NOIR, a game at cards, often called *trente et quarante*—thirty and forty. In this well-known game six packs of cards are used. The face or court cards count ten, the others count according to the number of spots. It is played between a banker and an indeterminate number of players. The banker takes his position at the middle of the table, at each end of which are two figures which are of a diamond shape and are colored red or *rouge* and black or *noir*. There are four chances on which the player may lay his stake: *rouge*, *noir*, *couleur* and *inverse*. The cards must be shuffled and cut and laid in a row face upwards. The banker stops when the total of points represented is between 30 and 40—the ace counting one. This line, or row of cards, is the one designated as *noir*. Another row is immediately dealt, which is called *rouge*. If the sum of the cards in *rouge* most closely approximates 31, those who have staked on that color win, and receive double the sum wagered. If *noir* wins the players staking on that color become winners with stakes doubled. If the points of the two colors are equal, that necessitates another deal. Should the sum in each color be exactly 31, then the banker takes half of all the stakes. If the first card turned up is of all the winning color, *couleur* wins. In the contrary case, *inverse*.

W.R.B.

ROULETTE, a game of chance played on a table in the center of which is a bowl-shaped cavity, about two feet in diameter, whose sides are divided into 38 compartments, painted black and red alternately. The bottom of the bowl revolves on a central axis. When the movable bottom is put in motion, an ivory ball is thrown into the cavity, and when the movement ceases the ball falls into one of the compartments at the sides. At the ends of the table are 38 spaces into which the players place their stakes. These spaces are numbered correspondingly with the numbers in the compartments of the wheel, viz., 1 to 36 and a single and a double 0. The numbers are alternately red and black. Besides playing the numbers, the player can put his stake on either the red or the black, and receive, in case the ball falls into a red compartment and his stake is on the red, an amount equal to what he has played. He can also play an odd or even number in the same way, or again the high and the low. If he plays the high, he is betting that the ball will fall in a number above 18 to 36; if the low, a number from 1 to 18. When the player puts his stake on any single number and the ball

falls in the corresponding number in the wheel, he receives 36 times the amount of his stake. The bank in an American game of roulette has a larger percentage than that of the French one, from the fact that the former uses both the single and the double 0, while the latter use but the single 0. In the event that the ball should fall in either the single or the double 0, the bank claims every bet on the table unless a player has a bet on either the single or double 0, when he receives 36 times the amount of his stake. There are further regulations, by which a player receives 18 times his stake if he plays 2 numbers, 12 times if 3 numbers, etc. The game is 19 to 18 in favor of the bank, but other ways of playing it vary the proportion. This game was forbidden by law in 1838 in France, and in 1873 in Germany. It is proscribed in Great Britain and the United States by their respective gambling-laws.

ROUMANIA. (For general article, see ROUMANIA, Vol. XXI, pp. 18–27.) The area and population are known only by estimates. The total area is 50,720 square miles, and the population by the census of Dec., 1899, was 5,912,520. The people themselves, though of mixed origin, may now be regarded as homogeneous. Roumanians are spread extensively in the neighboring countries—Transylvania, Hungary, Servia, Bulgaria; their total number probably is between nine and ten millions. Included in the population of Roumania proper are 5,469,036 Roumanians, 300,000 Jews, 200,000 gipsies, 50,000 Bulgarians, 20,000 Germans, 1,500 Magyars, 15,000 Armenians, 2,000 French, 1,000 English, besides about 3,000 Italians, Turks, Poles, Tartars, etc.

The constitution in force in 1899 was voted by a constituent assembly, elected by universal suffrage in the summer of 1866. It has twice been modified—in 1879, and in 1884. The Senate consists of 120 members, elected for 8 years, including 2 for the universities, and 8 bishops. The Chamber of Deputies consists of 183 members, elected for four years. A senator must be 40 years of age, and a deputy 25. Members of either house must be Roumanians by birth or naturalization, in full enjoyment of civil and political rights, domiciled in the country. For the Senate an assured income of about $1,800 is required. All citizens of full age, paying taxes, are electors, and are divided into three electoral colleges. For the Chamber of Deputies, electors who are in possession of property bringing in $250 or upward per annum vote in the first college. Those paying direct taxes to the state of $4 or upward annually, vote in the second college, as well as persons exercising the liberal professions, retired officers, state pensioners and those who have been through the primary course of education. The third college is composed of the remaining electors, of whom those not knowing how to read or write vote indirectly. For the Senate there are only two colleges. The first consists of those electors having property yielding annually at least $400; the second, of those persons otherwise eligible, but whose income from property is from $160 to $400 per annum.

REIGNING KING AND ROYAL FAMILY. Carol I, King of Roumania, was born April 20, 1839, a son of Prince Karl, of Hohenzollern-Sigmaringen. He was elected "Domnul," or Lord, of Roumania, April 20, 1866, and accepted his election May 22, 1866; was proclaimed King of Roumania, March 26, 1881; was married Nov. 15, 1869, to Princess Elizabeth von Neuwied ("Carmen Sylva"), born Dec. 29, 1843.

The succession to the throne of Roumania, in the event of the king remaining childless, was settled, by article 83 of the constitution, upon his elder brother, Prince Leopold, of Hohenzollern-Sigmaringen, who renounced his rights in favor of his son, Prince Wilhelm, the act having been registered by the Senate in October, 1880. Prince Wilhelm, on Nov. 22, 1888, renounced his rights to the throne in favor of his brother, Prince Ferdinand, born Aug. 24, 1865, who, by a decree of the king, dated March 18, 1889, was created "Prince of Roumania."

The king has an allowance of about $237,000.

EDUCATION AND RELIGION. Education is free and compulsory where there are schools. According to the published summaries of 1898–99, there were 4,057 primary schools, with 321,873 pupils. There were 8 normal schools, 52 high schools, and 2 universities, the latter at Bucharest and Jassy.

Of the total population of Roumania proper, it is estimated that 5,408,743 belong to the Orthodox Greek Church, 168,276 are Roman Catholics or Protestants, 6,598 Armenians, 10,000 Lipovani (Russian heretics), 269,000 Hebrews, 40,000 to 44,000 Mohammedans. The government of the Greek Church rests with two archbishops, the first of them styled the Primate of Roumania, and the second the Archbishop of Moldavia. There are, besides, six bishops of the National Church, and two Roman Catholic bishops.

FINANCE. The chief sources of revenue consist in direct and indirect taxes, and the profits derived from the extensive state domains and valuable salt-mines, and the salt and tobacco monopolies. The capitation tax is $1.14 per head. There is an income tax of 6 per cent on houses, 5 per cent on property farmed by a resident owner, 6 per cent on property let by an owner resident in Roumania, and 12 per cent on estates of non-resident owners. The revenue for the year 1901–02 was $43,644,067; expenditure, $42,945,749. The budget estimate for 1899–1900 was $45,076,568 alike for revenue and expenditure. The unit of value is the leï, equivalent to 19.3 cents.

The public debt of Roumania amounted on April 1, 1901, to $296,395,558. Of the total amount, more than half has been contracted for public works, mainly railways. The remainder has been contracted to cover deficits, reduce unfunded debt, and pay peasant freeholds.

ARMY AND NAVY. The entire military strength of Roumania is divided into permanent, territorial, militia, and *levée en masse*. The strength of the permanent army in time of peace is 3,280 offi-

cers, 388 employees, 60,000 men, 11,930 horses, and 390 guns. The total of the territorial army is 72,000 men and 7,500 horses. The militia consists of 33 regiments of infantry. Strength of the *levée en masse* is not definitely fixed.

Every Roumanian from his 21st to his 46th year is obliged to serve either in the permanent army three years of active service, or in the territorial infantry five years of active service, or in the territorial cavalry four years of active service, and afterward, till the age of 30, serve in the reserve of the army to which he belongs. The entry into the permanent or territorial army is decided by lot. All young men not taken for the conscription form part of the militia. After completing their service in the permanent or territorial army, all are enrolled in the militia until their 36th year.

Roumania has in the navy the *Elisabeta*, a shot-protected cruiser of 1,320 tons displacement and 4,500 horse-power, 3½-inch armor at the belt; four 6-inch and eight machine guns; the *Mircea*, training-ship; a composite brig of 350 tons, a yacht of 350 tons, a screw dispatch vessel, 7 gunboats, 6 coast-guard vessels, and 6 first-class and 2 second-class torpedo-boats; also a floating dock. There are about 50 officers and 1,600 seamen.

The total number of vessels that entered the ports of Roumania in 1900 was 27,090 of 7,528,855 tons; and the number that cleared was 27,015 of 7,084,990 tons. In 1900, Roumania's merchant navy included 392 vessels of 74,604 tons, including 54 steamers of 12,785 tons. In 1901, there were 2,060 miles of railway, the state conducting all of it. The imports for 1901 were valued at $43,400,000, the exports at $56,000,000.

ROUMANIAN LANGUAGE. See ROMANCE LANGUAGES, Vol. XX, p. 686.

ROUMANILLE, JOSEPH, a French poet; born in St. Remy, Bouches-du-Rhône, Aug. 8, 1818; professor in a Tarascon school; finally settled in Avignon as a bookseller. While at Tarascon he wrote a poem in the Provençal language to please his mother, who could not understand his French verse. The title of the work was *Jejè*, and its literary style was the revival of a form of speech once common in France, but obsolete at this time except among certain country people. A coterie intent on a Provençal renaissance soon gathered about him, which took the name of the Félibres, and of it Frédéric Mistral became the chief ornament; Roumanille, at the time of his death, was its Capoulié. He wrote *Oubrets en Vers*, *Lou Curat de Cucugna*, and *Lou Abal Tabuissoun*. His writings are characterized by the blithe gayety and the monkish paganism of troubadour times—quaint, sincere and humorous in their childlike artlessness. He died in Avignon, May 24, 1891.

ROUNDHEAD. See WHIG AND TORY, Vol. XXIV, p. 570.

ROUND-TABLE. See ARTHUR, Vol. II, 568.

ROUND-TABLE CONFERENCE, THE. See HOME RULE, in these Supplements.

ROUPHI OR RUPHIA, a river. See ALPHEUS, Vol. I, p. 540.

ROUSE POINT, New York, a village of Clinton County, half a mile south of the Canadian boundary, and on the west shore of Lake Champlain, at the outlet of the Richelieu River, 185 miles north of Albany. It is an important junction and port of entry on divisions of the Delaware & Hudson, the Grand Trunk and the Rutland railroads, and on the Central Vermont main line. Lumbering and a shipping trade constitute the chief industries. North of the village are the remains of Fort Montgomery, built unknowingly on Canadian territory at a cost of $500,000 by the United States Government after the War of 1812; it was abandoned, but since the Ashburton Treaty of 1842 is included in United States territory. Population, 1890, 1,856; 1900, 1,675. C.L.S.

ROUSSEAU, LOVELL H., an American soldier and politician; born near Stanford, Ky., Aug. 4, 1818. He studied law, and in 1841 began practice in Bloomfield, Ind. He was a member of the Indiana House of Representatives, 1844–45; served as captain in the Mexican war; sat in the Indiana Senate; returned to Kentucky, and began practice in Louisville; and was elected to the Kentucky Senate. He served with distinction in the Union army during the Civil war, and rose to the rank of major-general of volunteers. He was a Representative in Congress from Kentucky from Dec. 4, 1865, to July 21, 1866, when he resigned, owing to a fracas in the Capitol; was subsequently re-elected, and served from Dec. 3, 1866, to March 3, 1867, when he was appointed brigadier-general in the United States Army and assigned to duty in Alaska. Later he was appointed to command the Department of the Gulf, and died in New Orleans, Jan. 7, 1869. E.E.T.

ROUSSEAU, PHILIPPE FRANÇOIS, painter; was born in Paris on February 25, 1816, and studied under Bertin and Gros. He received numerous medals for his works, at the Salon and at world's fairs, and was made an officer of the Legion of Honor in 1870. He died on December 5, 1887. W.F.J.

ROUSSET, CAMILLE FÉLIX MICHEL, historian; was born in Paris on February 15, 1821, and was educated at the University and the College of St. Louis. He was a professor successively at Grenoble, at the Collège Bourbon and at the Lycée Bonaparte, and in 1864 was made historian and librarian to the French Ministry of War. In 1871 he was made an officer of the Legion of Honor and was elected to the French Academy in place of Prevost-Paradol. He wrote a *Précis of History of the French Revolution* (1849); *The Volunteers of 1791–1794* (1870); *The Grand Army of 1813* (1871); *History of the Crimean War* (1877); *The Conquest of Algiers* (1879), and numerous other historical works. He died at St. Gobain on October 19, 1892. W.F.J.

ROUTH, MARTIN JOSEPH, an English clergyman and educator; born in South Elmham, Suffolk, Sept. 18, 1755. After graduating at Oxford in 1774 he held various college positions until he became president of Magdalen College in 1791,

which post he retained nearly sixty-four years. In 1810 he was presented the living of Tylehurst, Berkshire. Routh published an edition of Plato's *Enthydemus et Gorgias;* edited Burnet's *History of His Own Times;* and a volume of *Scriptorum Ecclesiasticorum Opuscula* (1832). But he was best known by his valuable collection of the fragmentary writings of the Christian Fathers of the 2d and 3d centuries under the title, *Reliquiæ Sacræ* (4 vols., 1846–48). He died in Oxford, Dec. 22, 1854.

ROUTING-MACHINE. A mechanism for cutting away portions of a surface, as of wood. It is used to lower the blank spaces of engravings, for various gaining operations, for letting in the risers and treads of stairways, and for numerous operations in cabinet work. A stout upright column bears a hinged framework, at the extremity of which is the rotating cutter. The frame is powerfully braced, to avoid spring, and the cutter is driven by means of pulleys on the column, at the hinges and on its own spindle, these pulleys being connected by belts. This arrangement allows the cutter full play horizontally anywhere within the swing of the frame. Handles are placed on the frame for guiding the cutter according to the will of the operator, and a screw is provided for feeding the cutter-spindle to its work.

ROVE-BEETLES, the popular name for the beetles of the family *Staphylinidæ*. They are small insects, with very short wing-covers (*elytra*). Representatives of the family are common under stones and other objects.

ROVING. See COTTON MACHINERY, Vol. VI, pp. 438, 439.

ROWAN, STEPHEN CLEGG, naval commander, was born in Ireland on December 25, 1808, came to America in boyhood, and studied at Oxford College, Ohio. While there he was, in February, 1826, appointed a midshipman in the United States navy. In 1837 he was promoted to be a lieutenant, and as such served in the Mexican War with high credit. At the beginning of the Civil War he was a commander, and he served actively throughout that war; at first on the Potomac River, then with Burnside's expedition to the North Carolina coast, and then off Charleston, S. C. In the last named service his work was particularly arduous, and was performed with exceptional discretion and efficiency. He was promoted for merit to be, successively, captain, commodore, and rear-admiral, attaining the latter rank at the end of the war. In 1866–67 he was in charge of the navy-yard at Norfolk, and for several years thereafter commanded the Asiatic squadron. While in Asian waters, on August 15, 1870, he was promoted to the grade of vice-admiral. Upon his return home he was put in command of the navy-yard at New York, then became president of the board of naval examiners, in 1882 was made superintendent of the naval observatory, and finally in 1883 was appointed head of the lighthouse board. On February 26, 1889, he was placed upon the retired list. He died on March 31, 1890. W. F. J.

ROWAN-TREE. See ASH, Vol. II, p. 594.

ROWBOTHAM, JOHN FREDERICK, poet and historian; was born in Yorkshire, England, on April 18, 1859, and was educated at Balliol College, Oxford. He was elected to a scholarship, and traveled for years in Spain, Italy, Austria, Germany and France. He entered the ministry of the English Church, and served in various places. He has published *The History of Music* (1887); *The Death of Roland: An Epic Poem* (1888); *Poetical Works* (1889–90); *A Short History of Music* (1891); *The Private Life of the Great Composers* (1892); *The History of Rossall School* (1894); *The History of the Troubadours and the Courts of Love* (1895); *The God Horus: A Novel of Ancient Egypt* (1898), and *The Human Epic* (1902). W. F. J.

ROWING. In recent years no radical modifications have been made in the style of boat used. They are mostly built of cedar or some such wood, although a few American crews have tried paper boats; but these have not been very popular. Aside from this, the only general improvement has been in the seat. All oarsmen now use a seat on rollers instead of the old sliding style.

The chief rowing events in England are still the annual race between Oxford and Cambridge, and the international regatta at Henley. In the former, beginning with 1886, Cambridge won four years in succession, but since then Oxford has made seven straight wins, and in 1893 established a new record of 18 minutes and 47 seconds for the course. Out of 52 races betwen them Oxford has now won 30 and Cambridge 22 races. At Henley the interest was much heightened in 1895 by the appearance of the Cornell College crew from America, and in 1896 by the entrance of Yale and by the appearance of Dr. McDowell of Chicago.

In America rowing has existed since the beginning of the century, but the interest in crews was purely local until after 1850, when the leading colleges took up the sport. The first intercollegiate boat race was between Yale and Harvard, on Lake Winnipiseogee, Aug. 3, 1852. Since then various college associations have existed, sometimes including one set of colleges and sometimes another, and at one time (1872) one existed having 11 colleges represented. In 1876 Yale and Harvard formed a dual association, which existed until 1895, when it was discontinued. All except the first two of these races, which were rowed at Springfield, were rowed at New London. Out of 20 races Yale won 13 and Harvard 7, and the best time, 20 minutes 10 seconds, made in 1888, was by Yale. This is also a world's record for four miles with 8-oared shells. In 1890 Cornell and the University of Pennsylvania formed an association, and in 1895 included Columbia. Up till the latter year Cornell had always won, but her best crew was at Henley in that year, and Columbia won; while Cornell's crew in England was not fortunate enough to win. In 1896 Yale's crew was in England, when they met defeat, so the Cornell-Columbia-Pennsylvania Asssociation included Harvard, Cornell winning.

Harvard and Columbia also established an asso-

ciation for freshmen crews in 1880, which lasted till 1896, when they included the Cornell freshmen, who before had always won from Pennsylvania. Yale also rowed from 1891 to 1895, but in 1895 the University of Wisconsin, which for a number of years had supported a crew, sent it east and defeated the Yale freshmen. Among the colleges one of the most remarkable records is that of Cornell, which out of 43 intercollegiate races, including freshmen, since 1873 has only lost 9.

The National Association of Amateur Oarsmen, formed in 1873, holds an annual regatta at Saratoga, which is the chief rowing attraction of the year outside of the intercollegiate contests. The events competed are as follows: Single-scull shells, senior; single-scull shells, junior; pair-oared shells; double-scull shells; 4-oared shells, senior; 4-oared shells, junior; 8-oared shells, senior; 8-oared shells, junior. This association has a membership of 93 clubs, in all parts of the country.

ROWLAND, Henry Augustus, an American scientist; born in Honesdale, Pa., Nov. 27, 1848. He graduated at Rensselaer Polytechnic Institute in 1870, and engaged in railroad surveying, 1871. He taught in Wooster University, 1871–72; was instructor (1872–74) and assistant professor of physics (1874–75) in the Rensselaer Polytechnic Institute; studied abroad for a year; and accepted the chair of physics at Johns Hopkins University in 1876, a position he held until his death. He was a member of the Electrical Congress at Paris and served on the jury of electrical exhibits there in 1881, and the same year was made chevalier and in 1896 officer of the Legion of Honor. His principal scientific work has been the discovery of magnetic action due to electric convection; the exact determination of the mechanical equivalent of heat; the discovery of concave grating; and the invention of the machine for ruling gratings by which spectrum analysis has been revolutionized. He received the Rumford, Draper, and Mattenci medals for his discoveries. He was a member of the National Academy of Sciences; a fellow of the American Association for the Advancement of Science; and an honorary member of several British and Continental philosophical societies and institutions of learning. He died in Baltimore, Md., April 16, 1901. E.E.T.

ROYAL, Joseph, publicist, was born at Repentigny, Quebec, Canada, on May 7, 1837, and was educated at St. Mary's College, Montreal. He became a journalist, founding *L'Ordre*, *Le Nouveau Monde*, *La Revue Canadien* and *Le Metis*, now *Le Manitoba*, the last named at Winnipeg. He also rose to eminence at the Winnipeg bar, was a member of the Manitoba legislature in 1870–79, and thereafter member of the Dominion House of Commons until 1888, being also attorney-general and minister of public works. In 1888 he was made governor of the Northwest Territory and filled that place until 1893. He was vice-chancellor of the University of Manitoba in 1877, and a commissioner for a revision of the statutes. Since 1893 he has been editor of *La Minerve*, of Montreal, the journal on which he began his career in 1857. He has written a number of political pamphlets. W.F.J.

ROYAL ACADEMY. See Academy, Vol. I, p. 75.

ROYAL ARCANUM. See Benefit Societies, in these Supplements.

ROYAL GEOGRAPHICAL SOCIETY. See Geography, Vol. X, p. 172.

ROYAL INSTITUTION. See Societies, Vol. XXII, p. 223.

ROYAL SOCIETY. See Societies, Vol. XXII, p. 223.

ROYAL TEMPLARS OF TEMPERANCE. See Benefit Societies, in these Supplements.

ROYCE, Josiah, an American educator; born in Grass Valley, Cal., Nov. 20, 1855. He graduated at the University of California in 1875, in which institution he was instructor of English literature and logic, 1878–82. He has been instructor and assistant professor of the history of philosophy at Harvard College, 1882–92, and professor since the latter year. He is the author of *The Spirit of Modern Philosophy* (1892); *The World and the Individual* (1901); *The Conception of Immortality* (1900). E.E.T.

ROYERSFORD, Pennsylvania, a borough of Montgomery County, on the Schuylkill River, opposite Spring City, and 32 miles north of Philadelphia, on the Philadelphia & Reading railroad. It manufactures agricultural implements, stoves, glass, and fire brick. Population, 1890, 1,815; 1900, 2,607. C.L.S.

ROZE, Marie. See Mapleson, in these Supplements.

RUATAN or ROATAN. See Honduras, Vol. XII, p. 133.

RUBERYTHRIC ACID. A complex substance found in the madder-root, which breaks up into glucose and alizarin.

RUBIACEÆ, an exceedingly large family of gamopetalous plants, containing almost five thousand species, mostly tropical or sub-tropical, and especially American. No external characters can easily distinguish the family, as in many other families, the opposite leaves and interpetiolar stipules probably being the best index. The great subdivisions of the family, sometimes regarded as distinct families, are the *Cinchoneæ*, to which belong the cinchona (quinine) and its allies; the *Coffeeæ*, the coffee-plant and its allies; the *Spermacoceæ*, a small group of weeds, chiefly tropical; and the *Stellatæ*, the most northern group of the family, and chiefly represented in our flora by the species of *Galium* or cleavers.

RUBIAN. See Madder, Vol. XV, p. 177.

RUBICELLA. See *Spinel*, under Mineralogy, Vol. XVI, p. 402.

RUBICON, a small river of northern Italy, flowing into the Adriatic, which in 49 B. C. formed the southern boundary of the province governed by Julius Cæsar. For Cæsar to cross it with his army at the outbreak of the civil war between him and Pompey would virtually have been a declaration of war against the republic; hence, "to cross the Rubi-

con" has come to mean to take a step which cannot be retraced, to commit one's self to a momentous and hazardous undertaking. It is not certainly known whether the modern Luso or the Fiumicino was the ancient Rubicon, but there is a preponderance of evidence in favor of the latter. See ITALY, Vol. XIII, p. 446.

RUBIDIUM. See POTASSIUM, Vol. XIX, pp. 609, 610.

RUBIN, a dye. See FUCHSINE, in these Supplements.

RUBINSTEIN, ANTON GRIGORIJEWITSCH, a Russian pianist and composer; born at Wichwatinetz, in the Russian government of Cherson, Nov. 18, 1829; received his first instruction in piano-playing from his mother and later from Alex Villoing. After a stay of one year and a half at Paris he gave concerts in the Netherlands, Germany and Sweden. In 1844 he settled in Berlin, studying composition under Dehn, and in 1846 in Vienna, and in 1848 returned to Russia. From 1854–81 he toured Germany, France, England, North America (1872); Italy and Spain. From 1885–86 he gave a cycle of historical piano recitals in the prominent centers of the continent, which had a sensational success. Since 1859 conductor of the Russian Society of Music, founded by himself, and director of the Petersburg Conservatory; he was ennobled by the Emperor of Russia in 1889. He died Nov. 20, 1894, at Peterhof. Rubinstein ranks as one of the foremost of modern piano virtuosos, while as a composer, he shows, especially in his earlier compositions, great originality and a virile temperament. Among his compositions are the Russian operas *Dimitry; The Revenge; The Demon* and *Gorjusha;* the German operas *Die Kinder der Heide; Feramoras* (*Lalla Rookh*); *Die Makkabaer; Nero; Unter Räubern*, and *Der Papagei;* the ballet *Die Rebe;* the oratorios *Das Verlorene Paradies; Der Turmbau zu Babel; Sulamith; Moses* and *Christus;* 5 symphonies, overtures, string quartettes, piano trios, concert and sonatas and characteristic pieces for piano, song and choruses. He published *Die Music und ihre Meister* (1862).

ANTON RUBINSTEIN.

G.A.S.

RUBLEE, HORACE, an American editor and statesman; born in Berkshire, Vermont, August 19, 1830; went with his parents to Sheboygan County, Wisconsin, in 1846; learned the printing-business in Madison, where he went in 1848; was legislative correspondent for the Madison *Argus*, and afterward editorial writer on the *State Journal*, then a Whig organ, of which he became editor. For years he stood at the head of the Republican Party in the state; took an active part in the election of Lincoln, and successfully supported for the United States Senate T. W. Howe, who had opposed the ideas of state rights. In 1869 he was appointed minister to Switzerland, and by his timely articles on the Alabama question in European journals received the thanks of the Secretary of State. He resigned his position as minister in 1876, and the following year was again appointed chairman of the State Central Republican Committee. He made a bold and successful stand in the succeeding campaign for sound money; in 1881 became editor of a new journal, *The Republican and News*, later consolidating with the Milwaukee *Sentinel*, and supported the candidacy of W. D. Hoard for governor. He died in Milwaukee, Oct. 19, 1896.

RUBRIC. See MISSAL, Vol. XVI, p. 532.

RUDBECK, OLOF. See SWEDEN, Vol. XXII, p. 793.

RUDIMENTARY STRUCTURES. See EMBRYOLOGY, in these Supplements.

RUDINI, ANTONIO DI, MARQUIS, an Italian Premier; born in Palermo, Sicily, in 1839. In 1866, when only 26 years of age, he became mayor of his native city; was prefect of Palermo soon after, and held the same office in Naples in 1868. In 1869, at the age of 30, he was chosen Minister of the Interior, and later, until 1882, a deputy from Canicatti; then a deputy from Syracuse, when he formed a new Parliamentary group called the Young Right. Upon the overthrow of the Crispi Ministry, Feb. 6, 1891, Rudini was chosen Prime minister, which office he administered till May 6, 1892, when his policy for an increase in military expenses caused his retirement. He was succeeded by Crispi, who held the office till the spring of 1896, when the defeat of the Italian army by the Abyssinians and the presence of mobs in the streets of Rome caused him to resign, March 5, 1896. A new ministry was promptly formed under the Marquis di Rudini as President of the Council and Minister of the Interior. During Rudini's first premiership he reduced the expenses of African colonization, and in all his official acts sought to promote the strength, honor and dignity of Italy.

RUDLER, FREDERICK WILLIAM, an English scientist; born in London, July 8, 1840. In 1861 he was appointed assistant in the Museum of Practical Geology, and in 1870 assistant-secretary of the Ethnological Society. In 1876 he was appointed professor of natural science in the University College of Wales, but resigned in 1879 to become curator of the museum. In 1880 he presided over the anthropological department of the British association; was director of the Anthropological Institute, and editor of its *Journal*, joint editor of Ure's *Dictionary of Arts*, and with others the author of *Europe* in Stanford's *Compendium of Geography*, and president of the Geologists' Association (1889). He contributed to this ENCYCLOPÆDIA articles on EARTHQUAKE and ELECTRO-METALLURGY, and other subjects; was a copious writer of articles for scientific journals, and a lecturer with the London Society for the Extension of University Teaching.

RUE, an herb. See HORTICULTURE, Vol. XII, p. 302.

RUFFED GROUSE (*Bonasa umbellus*), a grouse so named because of a ruff of feathers on the neck.

common in the densely-wooded districts of temperate regions of North America. It is popularly known as partridge in New England and Western states, while in the Middle states it is called pheasant. See GROUSE, Vol. XI, p. 198; and BONASA, in these Supplements.

RUFFIN, EDMUND, an American agriculturist; born in Prince George County, Va., Jan. 5, 1794. He studied at William and Mary College and served in the war of 1812. Later he devoted himself to the study of practical agriculture, and for many years was president of the Virginia Agricultural Society. He published *Calcareous Manures* (1832) and for ten years conducted the *Farmer's Register*. He served in the State Senate, 1824–27. An enthusiastic secessionist, he fired the first gun at Fort Sumter. He committed suicide near Dansville, Va., June 17, 1865.

E.E.T.

RUGER, THOMAS HOWARD, an American soldier; born in Lima, N. Y., April 2, 1833. He graduated at West Point in 1854, and was assigned to the engineer corps; resigned his commission, April 1, 1855; practised law in Janesville, Wis., 1855–61; became lieutenant-colonel of the 3d Wisconsin Volunteers in 1861, and colonel in 1862; the same year was commissioned brigadier-general of volunteers; served in the Rappahannock campaign, and commanded a division at Gettysburg; aided in suppressing the draft riots in New York, 1863; served under Sherman and in the battle of Franklin; became colonel, U. S. A., in 1866; military governor of Georgia, 1868; was superintendent of the United States Military Academy, 1871–76; commanded the Department of the South, 1876–78; became brigadier-general, U. S. A., in 1886, major-general in 1895; and retired in 1897. E.E.T.

RULE NISI, a rule or order obtained in a cause pending in court upon an *ex parte* motion requiring the party against whom the rule is entered to show cause, by a certain time named in the rule, why the relief asked by the order should not be granted. Notice must be served upon the party against whom the rule was entered, and the question is then heard as other motions. The rule is made absolute upon the final hearing unless good cause is shown.

RULE OF THE ROAD. At sea. See NAVIGATION, Vol. XVII, p. 285. In general. See ROAD, RULE OF, in these Supplements.

RULING-MACHINE. See GRADUATION, Vol. XI, pp. 27, 28.

RUMFORD. See THOMPSON, XXIII, 330, 331.

RUMPELT, ANSELM, a German poet, born at Chemnitz, Saxony, Feb. 10, 1853. His *Will-o'-the-Wisps* (1878), a collection of historical lyrics, shows remarkable talent. He wrote under the pseudonym Alexis Aar.

RUMP PARLIAMENT. See *Pride's Purge*, under ENGLAND, Vol. VIII, p. 312.

RUMSEY, JAMES, an American inventor; born at Bohemia Manor, Cecil County, Md., in 1743. A machinist, he introduced improvements in mill machinery, and in September, 1784, exhibited on the Potomac a boat propelled by machinery, and in March, 1786, exhibited another boat propelled by steam. He obtained patents in Virginia and Maryland in 1787. In the following year the Rumsey Society was formed by Franklin and others, to aid him in his work. In London he met with general favor, and procured patents in England, Holland, and France. A successful exhibition was given on the Thames in December, 1792; but further prosecution of his plans was prevented by his death, which occurred in London, Dec. 23, 1792. In 1839 the Kentucky legislature presented his son with a gold medal commemorative of his father's contribution to the world's progress. E.E.T.

RUNES. See SCANDINAVIAN LANGUAGE, Vol. XXI, pp. 382, 383; and ALPHABET, Vol. I, p. 538.

RUNJEET-SINGH OR RANJIT. See PUNJAB, Vol. XX, pp. 117, 118.

RUNKLE, JOHN DANIEL, an American educator; born in Root, N. Y., Oct. 11, 1822. He graduated at the Lawrence Scientific School, Harvard, in 1851, and served as assistant on the *American Ephemeris and Nautical Almanac*, 1849–84; and edited the *Mathematical Monthly*, 1858–61. He was Walker professor of mathematics at the Massachusetts Institute of Technology from 1865 till his death; became its acting president in 1868, and president, 1870–78. In 1876 he introduced manual training into the United States from Russia. He was the author of *Analytic Geometry; The Manual Element in Education; Report on Industrial Education*, etc. He died in Southwest Harbor, Me., July 8, 1902.

E.E.T.

RUNNING. See HORSE-RACING, in these Supplements.

RUNNYMEDE, a meadow in Surrey, 21 miles S.W. of London. It was the scene of the signature of Magna Charta. See JOHN, Vol. XIII, p. 724.

RUNYON, THEODORE, lawyer and diplomat; was born at Somerville, New Jersey, on October 25, 1822, of French Huguenot descent, and was graduated from Yale College in 1842. He was admitted to the bar in Newark, N. J., in 1846; was city attorney in 1853–55, and city counsel in 1856–64, and in 1864 was elected mayor. During the Civil War he was commander of the first full brigade of New Jersey volunteers that went to the front. He was made chancellor of the state of New Jersey in 1873, and filled the office until 1887, and then declined reappointment. In March, 1893, he was appointed United States minister to Germany, and in October of the same year was raised to the rank of ambassador. He died suddenly at Berlin, on January 27, 1896. W.F.J.

THEODORE RUNYON.

RUPEE, a coin. See MONEY, Vol. XVI, 759.

RUPERT'S LAND. See HUDSON'S BAY COMPANY, Vol. XII, p. 347.

RUPHIA OR ROUPHI, a river. See ALPHEUS, Vol. I, p. 540.

RUPTURE. See HERNIA, Vol. XI, p. 672.

RURIK, founder of the Russian Empire. See RUSSIA, Vol. XXI, p. 96.

RUSDEN, GEORGE WILLIAM, an Australian educator and author. In 1849 he was appointed agent for the establishment of national schools in Victoria, Australia, and afterward agent and inspector of schools in New South Wales. In 1851, when Victoria was separated from New South Wales, he was made chief clerk in the Colonial Secretary's office; clerk of the executive council in 1852; clerk of the legislative council and of the Parliaments in 1856; from 1853 to 1882 served as magistrate; for some time member of the National Educational Board in Victoria; member of the council of the University of Melbourne from its foundation till his absence in Europe caused him to resign; fellow of the Royal Geographical Society, the Royal Historical Society, the Royal Asiatic Society, etc. He wrote *National Education; Discovery, Survey and Settlement of Port Philip; Curiosities of Colonization; History of New Zealand; History of Australia* (1883); *Aureretanga, the Great Refusal* (1890); and other works.

RUSH, JAMES, an American physician; son of Dr. Benjamin Rush; born in Philadelphia, Pa., March 1, 1786. He graduated at the College of New Jersey (now Princeton University) in 1805, took his degree of Doctor of Medicine at the University of Pennsylvania in 1809, and later studied at Edinburgh. He achieved a high reputation as a physician, but later in life sought retirement among his books. He was the author of *Philosophy of the Human Voice* (1827); *Analysis of the Human Intellect* (1865); *Rhymes of Contrast on Wisdom and Folly* (1869). He bequeathed $1,000,000 to the Philadelphia Library, conditioned on its exclusive appropriation to the Ridgeway Branch. He died in Philadelphia, May 26, 1869. E.E.T.

RUSH, RICHARD, an American statesman; son of Dr. Benjamin Rush; born in Philadelphia, Aug. 28, 1780. He graduated at the College of New Jersey in 1797, and was admitted to the bar in 1800. He became known as an orator and a successful advocate, and in 1811 was appointed attorney-general of Pennsylvania and comptroller of the United States treasury. In 1814 he was appointed attorney-general of the United States, and in 1817 went as minister to England, holding that position for seven years, during which period he negotiated several important treaties. In 1825 he became secretary of the treasury; later negotiated some American municipal loans in Europe; and in 1835 acted as boundary arbitrator between Ohio and Michigan. In 1836 he secured a settlement of the Smithsonian legacy, and later became a regent of the Institution. He was minister to France from 1847 to 1851. He published *Narrative of a Residence at the Court of London; Washington in Domestic Life;* etc. He died in Philadelphia, July 30, 1859. E.E.T.

RUSHVILLE, a village and the capital of Schuyler County, west-central Illinois, 45 miles E. N. E. of Quincy, on the Chicago, Burlington and Quincy railroad. It has wagon factories, flour-mills, brick and tile works and a creamery. Coal is mined in the vicinity. It is in a fertile agricultural region; contains five churches, a national bank, two newspaper-offices and a high school. Population 1900, 2,292.

RUSHVILLE, a village and the capital of Rush County, central southeastern Indiana, 39 miles E.S.E. of Indianapolis and 33 miles W.S.W. of Richmond, on the Cincinnati, Hamilton and Dayton, the Cleveland, Cincinnati, Chicago and St. Louis, the Pittsburg, Cincinnati and St. Louis and the Lake Erie and Western railroads. It has manufactures of flour, lumber and furniture, and has a large trade in grain, live-stock and lumber. Rushville has the most extensive blooded-horse market in the state. Population 1890, 3,475; 1900, 4,541.

RUSK, Texas, the seat of Cherokee County, a town on the St. Louis Southwestern railroad, and the terminus of the Texas State railroad to Palestine, 16 miles southeast of Jacksonville. Extensive iron deposits supply the raw material for the state smelting works and the articles produced by the prisoners in the Eastern Texas Penitentiary situated here. Population, 1900, 527. C.L.S.

RUSK, JEREMIAH MCLAIN, an American public man; born in Morgan County, Ohio, June 17, 1830. He removed to Vernon County, Wis., in 1853, held various local offices, and was a member of the State House of Representatives in 1862. In July of that year he became major, and later colonel, of the 25th Wisconsin Volunteers, and at the close of the war was brevetted brigadier-general. He was a Representative in Congress from Wisconsin, 1871–77. He was Secretary of Agriculture from March 3, 1889, to March 5, 1893. He died in Viroqua, Wis., Nov. 21, 1893. E.E.T.

JEREMIAH M. RUSK.

RUSK, THOMAS J., an American lawyer and public man; born in Camden, S. C., Aug. 8, 1802. He studied law, and began practice in Georgia, but moved to Texas in 1835. He was a delegate to the convention which declared for the independence of Texas in 1835, and was first Secretary of War of the new republic. At the battle of San Jacinto he took command of the forces after General Houston was wounded, retaining it until October, 1836, when he resumed his duties as Secretary of War. He was chief justice of the supreme court of Texas, 1838–42; president of the convention which confirmed the annexation of Texas to the United States in 1845;

and United States senator from Texas from March 26, 1846, to July 29, 1856, when he died, at Nacogdoches, Tex. E.E.T.

RUSKIN, JOHN, an English art critic and prose-writer, was born in London, Feb. 8, 1819. He was educated privately, as his autobiographical reminiscences in *Præterita* inform us, till he passed to Christ Church, Oxford, where he won the Newdigate prize for verse in 1839, and graduated in 1842. His taste for art was early manifested, and, after graduating, he studied painting under Harding and Copley Fielding, but his masters, as he tells us, were Rubens and Rembrandt. At the outset of his career he was led to take up a defense of J. W. M. Turner (q. v., Vol. XXIII, p. 710) and the contemporary school of English landscape-painting against the foreign trammels which had fastened themselves upon modern art, and especially to prove the superiority of modern landscape-painters over the Old Masters. This revolutionary opinion, though at first it was hotly combated, established the new critic's position as a writer on art, and the defense grew into the famous work called *Modern Painters* (5 vols., 1843–60). This elaborate work deals with general æsthetic principles, and, with a charm that is irresistible, presents us with its author's ideas of beauty, and enshrines word-poems on mountain, leaf, cloud and sea which, it is not too much to say, will live forever in English literature. In the second volume Mr. Ruskin takes up the Italian painters, and discusses at length the merits of their respective schools. From the study of painting, Mr. Ruskin passed for a time to that of architecture. In this department we have, from his pen, *The Seven Lamps of Architecture* (1849) and the *Stones of Venice* (1851–53). Then followed lectures on drawing, perspective, decoration and manufacture, with later crotchets and theories on political economy, pre-Raphaelitism, etc., with a flood of opinions on social, ethical and art subjects, enriched by rare intellectual gifts and religious fervor. His whole writings form a body of literature unique of its kind, pervaded with a charm of literary style, and inspired by a high moral purpose. Mr. Ruskin's excursions into non-æsthetic fields, and the strange jumble of Christian communism to which, late in life, he gave vehement expression, have detracted much from his early fame. In everything he wrote, the Ruskinian spirit comes strongly out, colored with an amiable egotism, and enforced by great assurance of conviction. The moral purpose he had in view, and the charm and elevated tone of his writings, lead us to forget the wholly ideal state of society he sought to introduce, and we are won to the man by the passion of his noble enthusiasms. With the advent of the pre-Raphaelite school, Mr. Ruskin warmly espoused its art-principles in a series of letters to the London *Times* in 1851, and in a number of lectures, since gathered into his *Collected Works*, in 26 volumes. The following are some of his varied lectures and treatises on æsthetic subjects: *Lectures on Architecture and Painting* (1854); *The Two Paths* (1854), dealing with art in its application to decoration and manufacture; *Elements of Drawing* (1857); *Elements of Perspective* (1859); *Ariadne Florentina* (1873), a monograph on Italian wood and metal engraving; and *Aratra Pentelici* (1872), on the principles of sculpture. Besides these, he published, at various times, a number of instructive and inspiring lay sermons on the mystical union between nature and art, beauty and utility, and their reflex in the reverential homage for the beautiful and the worthy in the mind and character of the race. In this latter service he has produced a great body of fine and thoughtful work, which is as enchaining as its meaning is often profound. The best known of these lay sermons are *The Crown of Wild Olive*, essays on work, traffic and war; *Sesame and Lilies*, essays, especially for girls, on improving literature; *Ethics of the Dust*, in which nature's crystallization is a foil for a diatribe against sordid living; *The Queen of the Air*, a splendid blending of his fancy with the Greek myths of cloud and storm; *The King of the Golden River*, a fairy story; *The Eagle's Nest*, on the relation of natural science to art; *Proserpina*, in which flowers were what storm and cloud were for *The Queen of the Air; Love's Meinie*, on birds; and *Deucalion*, on geology. His other writings embrace four volumes, entitled *Fors Clavigera* (1871–74), lectures to English workingmen and laborers; *Val d' Arno*, on thirteenth-century art in Pisa and Florence; *Pleasures of England*, on English modern art and history; *Time and Tide*, letters to a workingman; *Mornings in Florence*, Christian art-studies for travelers; *St. Mark's Rest*, on Venetian history; *Munera Pulveris* and *Unto This Last*, two treatises on political economy, with a volume of *Lectures on the Political Economy of Art* (1858). He has also published a monograph on *Giotto and His Works in Padua* (1854); two volumes of his letters, entitled *Arrows of the Chace* (1880); *Hortus Inclusus*, letters to women; *Notes on the Construction of Sheepfolds* (churches); a work on the *Poetry of Architecture;* a collection of his early *Poems*, and *Præterita*, previously mentioned, unfinished installments of an autobiography. In addition to this varied work for art, Mr. Ruskin has held a lectureship at Cambridge, and a professorship of fine art at Oxford, which he once left because of his opposition to vivisection at the university, and he founded St. George's Guild at Oxford for inculcating in young and old the gospel of manual labor, opposed to all modern mechanical and manufacturing processes, with the old-time virtues of purity, manliness and courage. In all these labors and aims Mr. Ruskin set before himself a high, if somewhat Quixotic, ideal of life, and with great earnestness did much, not only for the elevation of his fellow-men, but for the development of sound artistic taste and the enriching and spiritualizing of life by seeking to surround it at all times with the true and the beautiful. In 1873 Mr. Ruskin became his own publisher, and found it remunerative, as well as more

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satisfactory to his fastidious taste in books. In old age ill health arrested his productiveness. The best account of him is by his secretary, W. G. Collingwood, which appeared in 1893. Died at Brantwood, Eng., Jan. 20, 1900. G. MERCER ADAM.

RUSSELL, HENRY CHAMBERLAINE, a British astronomer; government astronomer of New South Wales, Australia, since 1863; fellow of the Senate of the University of Sydney, and vice-president of the Board of Technical Education, New South Wales. Under his direction, parties were sent out in 1874 and 1882 to observe the transit of Venus, and in 1881 that of Mercury. He presided over the first Australian Meteorological Conference in 1879. He wrote seventy-five or more reports and original papers upon astronomical and meteorological matters, which were published by the New South Wales government, by the Royal Astronomical Society of London, and by the Royal Society of New South Wales.

RUSSELL, WILLIAM CLARK, novelist; was born in New York city on February 24, 1844, the son of English parents; his father, Henry Russell, having been a well-known musical composer. His novels, which are many and popular, are chiefly devoted to incidents of seafaring life and adventure. Among them are *John Holdsworth, Chief Mate* (1874); *The Wreck of the Grosvenor* (1875); *The Lady Maud* (1876); *A Sailor's Sweetheart* (1877); *An Ocean Free-Lance* (1878); *The Frozen Pirate* (1877); *An Ocean Tragedy* (1881); *My Shipmate, Louise* (1882); *The Emigrant Ship* (1894); *The Ship, Her Story* (1894); *The Convict Ship* (1895); *What Cheer?* (1895); *Rose Island* (1896); *The Tale of the Ten* (1896); *List, Ye Landsmen!* (1897); *The Two Captains* (1897); *The Romance of a Midshipman* (1898); *The Ship's Adventure* (1899); *Overdue* (1903); *Abandoned* (1904), and *Wrong Side Out* (1904). He also has written a *Life of Nelson*; a *Life of Collingwood*; a *Life of Dampier*; *Pictures from the Life of Nelson*, and numerous articles and short stories. W.F.J.

RUSSELL, WILLIAM EUSTIS, statesman; was born in Cambridge, Massachusetts, on September 6, 1857, and was graduated from Harvard College in 1877. He studied law and was admitted to the bar. In 1881 he was elected to the Cambridge common council, and in 1883 became an alderman. In 1885 he was nominated for mayor of Cambridge by the Democrats and Independents, and was elected; and twice thereafter was re-elected. This made him a conspicuous leader of the Democratic party in that Republican state. In 1888 he was nominated for governor, and ran ahead of the Presidential ticket, but was defeated. In 1889 he was again a candidate, but again was defeated. In 1890, however, he was elected, and was the youngest man that ever filled the place of governor of Massachusetts; and in 1891 he was re-elected, though all the rest of the Democratic ticket was defeated. Again in 1892 he was re-elected for a third term. He died in Canada on July 16, 1896. W.F.J.

RUSSELL, SIR WILLIAM HOWARD, an Irish journalist; born in Lilyvale, County Dublin, March 28, 1821; entered Trinity College in 1838; entered the Middle Temple, and was called to the bar in 1850. On the declaration of war with Russia he was dispatched to the Crimea as special correspondent of the *Times*, through which journal he made known to the public the sufferings of the army in winter quarters. The account aroused such indignation that the ministry was succeeded by a government pledged to military reform. In 1857, on the outbreak of the Mutiny in India, he was again war correspondent for the *Times*. In 1861, at the beginning of the Civil War, he proceeded to Washington as correspondent of the same paper, and joined McDowell's army on the day of the first battle of Bull Run. His account of the rout of the Federal army was greatly censured in the United States, and gained for him the sobriquet of "Bull Run Russell." He was correspondent during the war between Prussia and Austria in 1866, between France and Germany in 1870, and was with Lord Wolseley in the Zulu troubles and in Egypt. Mr. Russell published numerous works, as *Letters from Crimea; Diary in India; My Diary North and South;* etc. He was a knight of the Iron Cross, commander of the Legion of Honor, and had Indian, Turkish and other war medals. He was knighted in 1895.

SIR W. HOWARD RUSSELL.

RUSSELL OF KILLOWEN (CHARLES RUSSELL), LORD, an English jurist; born on the outskirts of Newry, County Down, Ireland, in 1833, and died in London, August 10, 1900, at the age of sixty-seven. He came of an old Roman Catholic and patriotically Irish family. Commencing life in the office of an attorney at Newry, he turned toward the bar in 1851 and moved to London as offering greater possibilities of success. Here he supported himself at first by reporting in the press gallery of the House of Commons. In 1859 he was called to the bar at Lincoln's Inn and speedily became prominent as an advocate. He was appointed a queen's counsel in 1872, having established himself as one of the leaders of the English bar. In 1880, after two unsuccessful attempts, he entered Parliament and became, in turn, Solicitor-General and Attorney-General. A man of strong political convictions, he was an earnest follower of W. E. Gladstone and a warm advocate of Home Rule. He devoted little of his time to St. Stephen's or its politics, confessing,

LORD RUSSELL.

somewhat sadly, that "common law admitted of no bedfellow."

As an advocate, his fame was more than national, and few were the great trials in which he was not retained. Some one once said of him that he was the only man at the bar who could speak in italics. His voice, if it had not the exquisite silvery cadence of Lord Coleridge's, was clear, persuasive and resonant. The words were always aided by energetic action, and by the deep, gleaming eyes of the speaker. He could bring a special technical knowledge to bear upon almost any case submitted to him. It has been well said that no one but Lord Russell could have delivered that famous speech before the Parnell Commission of 1880. The skill with which he could play upon the emotions of a jury made him much sought after in society scandal suits. He was concerned as an advocate in the Colin Campbell divorce case, the Crawford divorce case, the Tranby Croft baccarat scandal, wherein the Prince of Wales was called as a witness, and defended Mrs. Maybrick for murder. While Attorney-General under the Gladstone administration of 1886, he was knighted. On the decease of Lord Bowen in 1894, he was appointed a Lord of Appeal in Ordinary, with a life peerage, and in July of the same year, Lord Chief Justice of England, in succession to Lord Coleridge.

In 1896 he visited the United States in company with Sir Frank Lockwood and other English jurists, and delivered an address on "International Arbitration" before the annual meeting of the Bar Association of America, held in Saratoga Springs, New York. He presided over the trial of Dr. Leander Starr Jameson and his fellow raiders for invading the Transvaal, and at a single sweep brushed away every legal technicality and cobweb of old-time law from the Foreign Enlistment Act of 1870.

RUSSELLVILLE, Arkansas, the seat of Pope County, a town 74 miles west of Little Rock, on the St. Louis, Iron Mountain and Southern railroad, and terminus of the branch line to Dardanelle, four miles south on the Arkansas River. It is a market town with grist and saw mills, and wagon, agricultural implement, and ice factories. Population, 1890, 1,321; 1900, 1,832. C.L.S.

RUSSELLVILLE, a town and the capital of Logan County, southwestern Kentucky, 47 miles N. of Nashville, on the Louisville and Nashville railroad, has a flour-mill, tannery, wagon, plow and tobacco factories. It is the seat of Bethel College (Baptist), an institution established in 1854, and had, in 1901, 7 instructors, 104 pupils and a library containing 6,000 volumes. The town has, besides, Logan College for Women (Methodist). Population 1890, 2,253; 1900, 2,591.

RUSSIAN EMPIRE. For general article on RUSSIA AND THE RUSSIAN EMPIRE, see RUSSIA, Vol. XXI, pp. 73–119.

Recent History. Five events of importance have marked the history of Russia in recent years. The Pamir difficulty (see AFGHANISTAN) may be dismissed with a brief reference, as that question, which at one time threatened the disruption of diplomatic relations between Great Britain and Russia, was amicably adjusted. The dreadful famine, which afflicted not less than 18 Russian provincial governments and some 36,000,000 of the subjects of the Tsar, was systematically fought, but it may be years before the peasantry of the stricken provinces will regain their former degree of prosperity. It was known as early as June, 1891, that the crops in the provinces of Perm, Astrakhan, Kostroma, Orel, Kursk, Kherson, and Kharkof would be very meager, and that the agricultural outlook in the districts of Vyatka, Nijni-Novgorod, Kazan, Simbirsk, Samara, Orenburg, Ryazan, Penza, Saratof, and Tula was of the blackest. This catastrophe was precipitated by a dreadful drouth, when, for five months, not a drop of rain fell in the afflicted districts. Blasting winds swept over the fields, blighting all grain The government threw itself into the breach and did its best to fight the famine, and it was nobly seconded by many of the great land-owners. Substantial aid was sent from America to the amount of about seven hundred and fifty thousand dollars. Seventy-five million dollars were given by the government to support the starving peasantry until the arrival of a new crop, and the Tsar himself contributed $4,000,000 to the relief fund. Pestilence, however, arrived to add to the horrors of the situation. Typhus and "hunger fever" spread rapidly, and the scourge of cholera made its way up the Volga valley to Nijni-Novgorod, Moscow, St. Petersburg, and the Baltic. A careful estimate of the cost of the famine to Russia, during the two years most affected, places the figures at $200,000,000.

The chief incident in Russian history in 1899 was the Peace Conference which, at the call of the Tsar, met in May at The Hague. (See under HAGUE PEACE CONFERENCE, in these Supplements.) In 1899 the government decided to adopt the Gregorian in place of the Julian calendar. When the new calendar comes into effect it will add 13 days to the one now in use in Russia. Russia continues to open up and develop Siberia, the chief instrument of which is the Trans-Continental railway. This line, when completed, will link the Empire in a continuous chain from St. Petersburg to Port Arthur and Ta-lien-wan, in her new province of Kwang-Tung extorted from China. An agreement between Russia and Great Britain upon their respective aims and interests as to railway development in China was come to in April, 1899. In 1900, on the breaking out of the Boxer anti-foreign disturbances in China, Russia took an active and prominent part, and, if true, meditates the annexation of Manchuria. Her aggression on the Chinese populations in the Amur valley has led to great cruelties. Russian attitude toward Finland and the Finns has also been harsh and intolerant. On the other hand, Russia has lately had a commission at work considering some other substitute for exile in Siberia in the case of criminals.

The enforced exodus of Jews from Russia, during the closing years of the reign of Alexander III, drew down upon the government the criticism of the press of civilized countries. In 1892, hundreds of them were expelled from the empire, and thousands more forced within certain restricted limits.

But there were still, in 1895, about 3,000,000 Jews in the empire.

A prodigious Russian enterprise is the Trans-Siberian railway, which, when it is completed, is expected to cause an enormous commerce to flow through Vladivostok and San Francisco. This line will be 4,950 miles long. It was begun in 1892 and is being pushed rapidly.

Emperor Alexander III died Nov. 1, 1894, after a few months' illness, and his eldest son, a young man of 26, at once ascended the throne as Emperor Nicholas II, and 25 days later married Princess Alix of Hesse. In celebration of this latter event the new Tsar pardoned 20,000 state prisoners, and his subjects ventured to hope that his reign would be milder and more humane than that of his predecessors. He and the Tsaritsa were crowned with most imposing ceremonies inside the Kremlin, in Moscow, July, 1896. A terrible catastrophe that caused the death of over 3,000 peasants in an unexplained crush and panic damped the enthusiasm of the assembled throngs. Shortly after the coronation it was authoritatively stated that an offensive and defensive alliance existed between Russia and France to counterbalance the power of the Triple Alliance. For Nicholas II, see NICHOLAS II, in these Supplements.

Population in 1897. The total population of the empire numbered, in 1897, 129,004,514. The population in cities of over 100,000 inhabitants reached the following figures: St. Petersburg, 1,267,023; Moscow, 988,614; Warsaw, 638,209; Odessa, 405,041; Lodz, 315,209; Riga, 256,197; Kieff, 247,432; Kharkoff, 174,846; Vilna, 154,132; Saratov, 137,109; Kazan, 131,508; Ekaterinoslav, 121,216; Rostov-on-Don, 119,889; Astrakhan, 112,880; Tula, 111,048; Kishineff, 108,796.

According to a recent partial census, the Hebrews number 2,843,364 in the western and southwestern provinces of Russia (2,261,863 in towns), that is, 11.3 per cent of the aggregate population; 77,275 in the three townships of Odessa (73,389, *i. e.*, 35.1 per cent of population), Kertch, and Sebastopol; and 1,134,268 in Poland (1890). Their aggregate number in Russia would thus exceed 3,500,000.

The Russian Budget for 1897 showed that the revenue for that year was $1,123,412,779, and the expenditure $1,169,033,760. The budget estimate for 1901 was, revenue, 1,730,096,000 roubles ($923,210,000); expenditure, about the same.

Public Debt. All the liabilities of the empire, inclusive of the debt for the redemption of land, and paper money uncovered, amounted on Jan. 1, 1901, to 6,384,880,893 paper roubles, or about $3,634,359,255.*

The Russian Army has been entirely reorganized since the Turkish War. Since the modification of the laws, June 26, 1888, the service has been organized as follows:

Out of about 870,000 young men reaching their majority every year, about 275,000 are taken into the active army, and the remainder are inscribed partly in the reserve and partly in the second reserve, or Zapas. The period of service is, in European Russia, 5 years in the active army (in reality reduced by furloughs to 4 years), 13 years in the reserve, and 5 years in the Zapas; 7 years in the active army and 6 years in the reserve, in the Asiatic dominions; and 3 years in the active army and 15 years in the reserve, in Caucasia. In case of need, the Minister of War has the right of keeping the men for another six months under the colors. Clergymen, doctors, and teachers are exempt.

In 1896, out of the 987,917 young men liable to military service, 30,585 (7,736 Hebrews) did not appear; 77,542 were found too weak for military service; 212,209 were inscribed in the second reserve as being single workers in their families; and 275,247 (15,831 Jews) were taken into the army, besides 3,394 Caucasian natives, out of 26,228 liable to service. The men inscribed in the reserve troops are convoked for drill six weeks twice a year.

The Zapas, formerly a simple militia, was reorganized in 1888, and the duration of the service prolonged to 43 years instead of 40. It is divided into two parts. The first part includes all those who have passed through active service, and those who have not been taken into the active army, though able-bodied. The second part (including all able-bodied men who have served in the first division, as also those liberated from service as not fully able-bodied, or being single workers in their families) can be called out only by an imperial manifesto.

The peace strength of the Russian army is 36,000 officers and 896,000 men. On a war footing the strength is estimated as follows:

	Infantry.	Cavalry.	Artillery.	Engineers.	Baggage Train.	Total.
Active Army.....	1,003,300	123,900	103,000	40,800	25,400	1,296,400
Reserve	660,700	102,500	30,900	9,200	.....	803,300
Troops in Fortresses.....	172,500	.....	83,200	10,300	.....	266,000
Reinforcements..	274,400	40,800	30,600	6,100	.....	351,900
National Defense.....	695,500	22,350	28,450	4,100	.....	750,400
Totals.....	2,806,400	289,550	276,150	70,500	25,400	3,468,000

Of these, 62,000 are officers, and 3,406,000 are privates. There are, besides, about 35,000 custom-house officers and men on the frontiers.

Navy. The imperial navy, in Nov., 1898, comprised 239 war vessels, including those built and building, of which 28 were battleships, 14 port-defense vessels, 29 cruisers, 41 gunboats, etc., and 127 torpedo-craft. There are, besides, 100 small vedette torpedo-craft on the Baltic Sea. This navy was commanded by a general admiral, the commander-in-chief, 15 admirals, 316 superior officers, 1,326 junior officers, 376 engineers, 521 medical and civil officers, 95 admiralty officers, and 29,850 men. The sailors are recruited in the same manner as the

*One ruble gold=77 cents. The ruble *argent*, or *credit*, fluctuates in value; its value has been lately about 51 cents. This fluctuation is not due to the fluctuation in the market value of silver, as it is represented by paper money only, which the Russian government does not accept at its treasury for more than 55 cents.

soldiers of the Russian army, and serve ten years,—seven in active service and three in the reserve.

The volunteer fleet, destined for commerce and the transport of exiles to Sakhalin in time of peace, and for war purposes in time of war, numbers ten cruisers.

The Seagoing Commercial Navy (including vessels of 100 tons and upwards) of Russia consisted, in the year 1898, of 391 steamers, of 116,593 tons register, and 1,755 sailing-vessels, of 155,430 tons register. About one-fourth of the vessels were engaged in trading to foreign countries, and the remainder were coasting vessels, many of them belonging to Greeks sailing under the Russian flag.

The chief Russian fair is that of Nijni-Novgorod. In 1890 the goods shipped to the fair were valued at $99,691,256, as against $106,354,140 in 1888. Of that there remained unsold goods to the value of $3,871,912 ($7,653,047 in 1888).

Land Transfers. The state of the redemption operation of the land allotted to the liberated serfs is seen from the following accounts up till Jan. 1, 1895:

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Number of male peasants who redeemed the land with state help	6,641,836
Number of acres redeemed	61,575,821
Value of the land, in rubles	704,018,004
Average price of the allotment	106 rubles
Average size of allotment, in acres	9.4
Average price per acre	11 rubles, 43 kopecks
Average former debt of the landowner to the state mortgage bank, per allotment	37 rubles, 32 kopecks
Average sum paid to the landlord, per allotment	68 rubles, 68 kopecks

Moreover, 109,791 leaseholders redeemed their allotments (2,100,000 acres) for the sum of $18,749,415, in South Russia and the Western Provinces, according to the laws of 1868–88, which recognize the private ownership of land.

Mining. The official returns for mining given below are for 1896. The following products for the year were: Gold, 37,176 kilograms; platinum, 4,930 kilograms; silver (1895), 10,757 kilograms; lead (1895), 412 tons; zinc (1895), 4,951 tons; copper, 5,416 tons; pig-iron, 1,612,000 tons; iron, 440,000 tons; steel, 879,000 tons; coal, 9,314,000 tons; naphtha, 7,057,000 tons; salt, 1,523,000 tons.

Industry. The number of all kinds of manufactories, mines, and industrial establishments in European Russia (without Poland and Finland) was 62,801 in 1885, employing 994,787 work-people, and producing a value of $562,072,148. The 20,381 manufactories of Poland employed 139,650 workmen, and produced a value of $102,202,210. The Caucasus had, in 1884, 14,244 manufactories, mostly small, with 43,502 workmen, producing a value of $19,117,450, chiefly in silk; while the 6,496 manufactories of Finland yielded $9,210,784. In European Russia only 545 manufactures have a yearly production above $275,000, and 2,417 above $55,000.

The cotton industry is rapidly developing, as also is that of wool, in southern Russia.

The mileage of the railways opened for traffic, in July, 1899, was 29,855 miles. The length of the lines owned and worked by the government was 16,414 miles. The chief line under construction, now almost completed, is the Trans-Siberian.

Exports and Imports. The chief trade of the empire is carried on through its European frontier, as seen from the following table. But the European frontier does not include the Caucasus, so that the rapidly increasing exports of grain, and especially of naphtha, from the ports of the Caucasus appear in the exports from the Asiatic frontier, although both are exported to Europe. On the other side, the arrivals of tea from China to Odessa or St. Petersburg appear in the imports to the European frontier.

EXPORTS.		1900
Through European frontier	(roubles)	457,155,930
Through Asiatic frontier	"	59,450,160
Trade with Finland	"	13,594,350
Total	($367,423,750)	530,200,440

IMPORTS.		
From European frontier	(roubles)	387,143,680
From Asiatic frontier	"	51,263,520
Trade with Finland	"	15,747,270
Total	($305,500,000)	454,154,470

If the trade of northern Caucasia via the Black Sea be added to the above figures for 1896 by the European frontier, the exports would be 589,691,370, and the imports 477,427,490 roubles.

Internal Troubles. During the years 1904–05, while Russia had a strenuous conflict on her hands with Japan, the unrest of her people at home occasionally assumed dangerous proportions. Acute stages of the unrest were manifested at various times and places by agitations for reform, protests against the bureaucracy and its tyrannous methods, strikes, riots, secret plots and assassinations. The troubles were the outcroppings of a dissatisfaction that had existed and been growing in intensity for a number of years. Among the direct causes, alleged to have contributed to the discontent resulting in violence, were the government's system of espionage and inhuman punishments, the enforced poverty and distress of the peasantry, burdensome taxation, the censorship of the press, lack of popular representation in the government and the hopeless economic condition of the people attributed to the misapplication of the country's resources. The war with Japan accentuated the grievances and increased the burdens to the limit of endurance.

The organization known as the Zemstvo came to the front in a new rôle, during these difficulties, and demanded a constitutional convention to arrange for a representative government. This action of the Zemstvos called forth a sharp rebuke from the Czar for having exceeded their province. In theory a Russian Zemstvo is an assemblage of the representatives of the three estates of Russia—the clergy, the nobility and the peasantry. Each district of Russia is supposed to be governed by it in local matters, relative to roads, schools, support of the indigent, public health, local taxes and the regulation of the provincial police. In fact, however, the Zemstvo is a mere labor-saving device for the benefit of the minister of the in-

terior, to whom all decrees of the provincial body must be submitted for modification, approval or rejection. As a labor-saving device, the Zemstvos serve a good purpose to the imperial government in working out the details of necessary improvements, plans, expenses, and arrangements for raising revenue. But when they sprang a sudden demand for a free parliament, it was significantly hinted that the existing membership had no certain tenure of office and that new members might be installed in their places, more pliant to the will of the minister of the interior. Impelled, apparently, by the motive to avoid more serious trouble rather than to favor the demands of the Zemstvos, a few days after penning his rebuke, on December 22, 1904, the Czar issued a aukse to conciliate them, promising justice to all, liberty of the press, and as much self-government as possible. While the Zemstvos were urging reforms in a legal and conservative manner, evidences were not lacking of more extreme measures being adopted in different parts of the country and its dependencies. In Finland, where the Russification policy was particularly obnoxious, deep seated antagonisms to the imperial government and its representatives were keeping up a continual ferment and, on June 15, 1904, had an outcropping in the shooting and killing of Governor-General Bobrikoff. The Czar, through Minister-of-the-Interior Von Plehve, had declared that the Finnish people should not suffer for the crime, but, from the same source of power, there followed the appointment of Prince John Obolensky to succeed Bobrikoff. Prince Obolensky had the reputation of being one of the most cruel and ruthless administrators in Russia. This appointment evidently did not mollify the bitter hatred already entertained towards Minister Von Plehve, as his assassination in the streets of St. Petersburg on the 28th of the following month, plainly indicated. All through the fall months of 1904, growing discontent was on the increase and a grave internal crisis was imminent. December 11, an anti-government mass meeting was held in St. Petersburg which was dispersed by mounted police and fifty persons injured. Several riots occurred at Moscow and in different parts of Russia during the latter part of the month. The New Year found the empire still in a state of internal dissension, liable to cause eruptions at any moment. An industrial strike of vast proportions was inaugurated at St. Petersburg and throughout northern Russia, and began to take on revolutionary tendencies. At the capital, January 22, nearly 100,000 strikers, under the leadership of Father Gopon, marched to the Winter Palace of the Czar to present a petition, praying for relief from intolerable laws. The authorities were prepared to disperse the petitioners, and more than 50,000 troops, drawn up in the streets and squares, received the crowds, first with a blank volley, and afterward with bullet, shell and saber, killing about 500 men, women and children and wounding eight or nine times as many. The total casualties, it was stated, were not less than 5,000. After the massacre, the strikers intrenched themselves in the streets of Vassili Ostroff, known as Basil Island, north of the Neva, and destroyed buildings, telegraph poles and other property and sacked armories, arsenals and cartridge factories. The mingled chagrin and desire of the people found expression in exclamations of "Down with the Czar!" "Down with Autocracy!" "Up with Constitutional Government!" The wanton slaughter of innocent people, on the occasion of a civil attempt to petition for rights, almost caused a general uprising over the empire. For several days St. Petersburg was practically in a state of siege. The strike spread to Narva, Saratoff and Reval, and the situation at Moscow for a time aroused the gravest fear. At Warsaw, at Mitau and other places troops were called out to disperse strikers and quell riots. Disorders were rife in Russian Poland, and on February 6 Procurator-General Soininen, of Finland, was assassinated at Helsingfors. On the same day, twenty strikers were killed by troops at Kalisz and one at Lodz and a few days later many more casualties were reported from that section. On February 17, Grand Duke Sergius, uncle of the Czar, was blown to pieces by a bomb at Moscow. By the last of February most of the railroads of Russia were under martial law. *Revised by* A.R.R.

RUSSIA LEATHER. See LEATHER, Vol. XIV, p. 388.

RUSSIAN LANGUAGE. See SLAVS, Vol. XXII, p. 157.

RUSSIAN LITERATURE. See RUSSIA, Vol. XXI, pp. 111–118.

RUSSO-JAPANESE WAR. Generally speaking, the war between Russia and Japan was the climax of a contention for relative rights, claimed by the one and denied by the other, over territory belonging to neither. A pent-up storm had been vacillating over the waters that wash the shores of Korea and Manchuria for almost ten years prior to its sudden outburst in the harbor of Port Arthur, February 8, 1904. The immediate cause was attributed to Russia's persistent occupation of Manchuria. While this occupation was the ostensible provocation inciting action, the inferences Japan drew from Russia's expansive policy in the Far East, coupled with her well-known desire to secure ice-free ports on the coasts of Korea with control of the contiguous territory, were the underlying causes impelling the attack.

Japan's hopes and ambitions had received a severe blow when she was despoiled of the greater part of the fruits of her victory over China, at the instigation of Russia. Then the latter grew more aggressive, while the little island empire had to be content with verbal objections and unavailing diplomacy until the outbreak of hostilities. The principal starting point leading up to this culmination was incident to and interwoven with the transactions immediately following the close of the China-Japan War of 1894–95.

Reference to some of the salient points of that war, and their relation to the past, is necessary here only so far as to get a clear conception of

their connection with the present subject. Former historical facts of the countries in question can be found under the captions of CHINA, JAPAN, RUSSIA and KOREA (or Corea), respectively, in both the main and supplementary volumes of this Encyclopædia.

Disturbances in Korea in 1894 furnished the occasion for waging war between China and Japan. Korea, while nominally independent, was in a peculiar sense dependent upon both China and Japan. She had in times past paid tribute and homage to both under the operation of suzerain powers. Although, antedating the war, Japan had been dealing with the Hermit Kingdom as an independent nation, China had not wholly abandoned her claims of suzerainty. Each power had special interest in Korea on account of the advantage to each from its location and ties of consanguinity.

In 1876, Japan opened up trade relations with Korea on the basis of friendship accorded independent nations. This act was followed by the leading powers at different periods during the next ten years. In 1885, Japan made a treaty with China that neither country was to land troops in Korean territory without due notice to the other and a mutual understanding relative to the dispatch and withdrawal of the same. In 1894 violent internal disturbances occurred in Korea and the inhabitants split into Chinese and Japanese factions, and China was appealed to for aid to quell the riots. She at once dispatched troops into Korea without informing Japan of her intention and the latter immediately alleged a violation of the treaty of 1885 and sent troops over to drive the Chinese out. In the series of conflicts which followed, Japan not only drove the Chinese forces from Korea, but captured a large part of Manchuria.

In the treaty of peace which was concluded at Shimonoseki, in April, 1895, the independence of Korea was recognized by both parties, and all that part of Manchuria which had been subdued by the conquering armies, including the Liaotung Peninsula (or Regent's Sword) and Port Arthur, was ceded to Japan as part of her spoils of victory. In addition to this, she was granted a money indemnity and the Island of Formosa. Then it was that Russia again became conspicuous in Eastern affairs by interposing an objection to the cession of Manchurian property to Japan. She was sustained in her objection by France and Germany, and, with the advice of Great Britain, sufficient pressure was brought to bear upon Japan to cause her to yield to Russia's wishes. It was plain that Russia did not want Japan for a neighbor, and the latter at once began to view the former's aggressions on Manchurian soil with suspicion. She believed that if Russia got one paw firmly fixed on Manchuria, she would soon be looking for a convenient spot in Korea for the other, and likely cast her eyes across the Korean Straits for other possessions. There could be no question but that Russia desired possession of Korea that she might then open a way by land to ice-free seaports. On the other hand, the independence of Korea and her seaports free from Russian dominance was essential to Japan's future prosperity. The climate, soil and products of Korea make it a country suitable for the surplus population of Japan, and valuable as a trading nation; but, above all, Japan could not afford to have Russia, her arch enemy, in possession of it and its littoral.

During the period elapsing between the time that the Japanese yielded to the demands of Russia to recede the conquered Manchurian territory to China and the outbreak of the war, Japan made continual protest against the tightening of Russia's hold in Manchuria. To strengthen her position she made a treaty of alliance with Great Britain in February, 1902, in which the two countries agreed to do everything necessary to maintain the independence and territorial integrity of China and Korea, and also agreed in case war should ensue, that if other powers should join the aggressor in hostilities against one of the contracting parties, the other should go to its assistance. Aside from this agreement with England, Japan was entirely dependent upon herself for the maintenance of her power and standing among the nations of the earth.

During this same period, Russia was making no open demonstrations of hostility toward the little nation in the sea, but the latter interpreted the former's continual growth of power in Manchuria as an ill foreboding.

The beginning of Russia's occupation of Manchuria was coeval with the franchises which China granted Russia for the extension of her great Siberian Railway through that country and the right to make other improvements in connection therewith. In obtaining grants and leases from China to build railroads in Manchuria, the right to police and protect property thus acquired naturally followed. Subsequent to this period, during the Boxer raid in 1900, the belligerents in Manchuria crossed the Amur River which divides that country from the Russian territory and attacked the Siberian city of Blagovieshtchensk. Russian military forces in Siberia vigorously resented the invasion and crossed the frontier to protect the vast Russian interests in Manchuria. This gave Russia a plausible pretext for increasing her armed forces in that country and she was quick to take advantage of the opportunity. When inquiries were made as to Russia's intentions toward Manchuria, her reply was that she would evacuate as soon as China had furnished guarantees absolutely necessary to her vast interests. A further pretext was furnished Russia for continuing her military occupation of Manchuria at the close of the China-Japan War, claiming that it was necessary for her to remain in possession of the country until the people became pacified and were able to readjust themselves to the new conditions, contingent upon both the disturbances caused by the late war and the necessary innovations on old practices and customs made by Russia, in the course of the improvements effected in that country.

In 1897, when Russia sent warships to Port Arthur, the other Powers manifested some anxiety as to the purpose of the movement to which Russia replied that they were there merely to pass the winter, that being a convenient harbor for that purpose; but they remained not only that winter but continuously for seven winters, when Japan undertook the task of driving them out.

The occupation and virtual annexation of Manchuria by Russia was generally regarded by the world at large as a violation of the pledges given by her government. An arrangement had been effected by which she was to evacuate Manchuria in eighteen months, one-third of their forces in six months, another third in twelve months and the remainder at the end of eighteen months; this was in compliance with a Manchurian convention arranged between Russia and China. There had been, however, during this period, no evidences of Russia's compliance with these arrangements. Finally, the day for her evacuation was set for Oct. 8th, 1903, and several of the other Powers, among them the United States, concurred with Japan in insisting upon her evacuation on that date, but she did not evacuate, and on that very day made a great display of military power, parading with flying banners, music and every symbol of rejoicing. To reconcile the other Powers she assured them that foreign commerce should be in no way interfered with by reason of her aforesaid occupation. In justification of her failure to evacuate the country, according to agreement, she claimed that in every treaty made to this effect there was embodied the phrase: "If action of other Powers proves no obstacle thereto." The inference was that Japan's action was the obstacle which stood in the way of carrying out the treaty provisions.

In addition to Russia's persistent occupation of Manchuria, in defiance of Japan's protest, another exasperating procedure was the Czar's appointment of Vice-Admiral Alexieff as Viceroy of the Amur territory and the Kwangtung Province,—the Port Arthur district. He was empowered with special powers of a very arbitrary and sweeping character. His promotion to this position made him the almost absolute ruler of the country and virtually annexed the province to Russia, the province which Japan had conquered eight years before and was compelled to give up by the pressure of outside influences.

Japan naturally felt resentful toward Russia when she saw the Russian flag flying over territory once hers by right of conquest, and what was still more distracting to her equanimity was the encroachment upon her influence in Korea. Her constant endeavor was to force Russia's retirement from Manchuria and wrest from her the recognition of Korea as a Japanese "sphere of influence." In other words, Japan desired to be recognized in her attitude toward Korea as similar to that of Russia toward Manchuria, but Russia refused to consider such a parallel feasible. Thus the negotiations were carried on but with little prospect of concluding satisfactory arrangements between the two Powers. A noticeable feature of the negotiations, as the relation became more strained, was that Japan's replies and demands were definite, decisive and immediate, and Russia's, while courteous, were vague, evasive and tardy. The relative conditions and necessities of the two nations are at least a partial explanation of this contrast of diplomacy.

With Japan, the demands she was making were vital to her perpetuity as a nation and were plainly within the limits of her just rights. With Russia, her contention did not involve her individual existence or even endanger her prosperity and yet, as national rights were usually viewed, Russia had from her standpoint justification for her conduct. She had material interests in Manchuria which she had legally obtained. She deserved credit for improvements she had made in the country. Its resources had been developed and its civilization advanced in consequence of Russia's operations there. She was entitled to gratitude for all that she had added to the sum of the world's progress, and it was not surprising to find her loath to renounce the prestige these achievements should give her in seeking further commercial advantages. If the interests of Japan alone had been involved in Russia's ambitions, it is probable she would have been more prompt and decisive in conveying her intentions to Japan, but the attitudes of other Powers and their views of international comity had to be considered. She might risk actions which would provoke an attack or declaration of war, but would not be justified in making the attack herself for the purpose of destroying a weaker nation. Japan evidently realized the full force of the situation and met equivocation with direct statement, and disguised diplomacy with frank determination until, despairing of peaceful solution, the issue was referred to the god of battles.

During the month of January, 1904, Russian military forces were gradually being increased in Manchuria and Russian war vessels were anchored in the harbors of Port Arthur, Vladivostok, Dalny and also at Chemulpo, on the coast of Korea, and she had dispatched troops to Seoul, the capital of the above Hermit Kingdom. Japan had been preparing for the conflict, which she saw impending, and when her appeals for her demands failed and the war-like aspect grew more threatening and imperative, she was quick to act, and on February 6th, 1904, the Japanese government recalled its representative from St. Petersburg, and Count Kurino, the Minister, with the entire legation at once withdrew. Russia then immediately recalled Baron de Rosen, her Minister, and his suite to the Mikado's Empire.

The Japanese government ordered Vice-Admiral Togo to sail with his fleet to Port Arthur. He promptly and quietly left Sasebo, a naval station in the Korean Straits, and proceeded to obey orders. In the harbor of Port Arthur lay the flower of Russia's sea power. It consisted of seven battleships and five commerce destroyers. Admiral Togo's fleet consisted of six battleships,

four armored cruisers, six commerce destroyers and a number of torpedo craft. The Russian vessels lay in the outer harbor, an advance guard of torpedo boat sentries being stationed five miles in the offing.

Admiral Togo with his fleet came within firing distance of the Russian vessels between eleven and twelve o'clock on the night of the 8th. Admiral Stark commanded the Russian fleet and, from all accounts, was very much surprised when the attack was made. Admiral Togo's torpedo boats made a brilliant dash at the big battleships of Russia and launched a number of torpedoes which struck the iron-clads named the *Czarevitch* and *Retvizan*, and also the *Pallada*, a protected cruiser of six-thousand six-hundred tons. The damaged ships were sunk in or near the entrance to the inner harbor. As the fire from the powerful guns of the Port Arthur fortifications became heavy, the Japanese fleet floated away until morning. Next day, February 9th, about noon, Admiral Togo's fleet again advanced to the attack and after an engagement, lasting an hour, effected serious damage to the Russian battleship, *Poltava*, and the cruisers *Novik* and *Diana* and *Askold*, all of which were penetrated by shells on or below the water line. After this, the Japanese fleet steamed south out of reach of the guns of Port Arthur. The loss in the two engagements, on the Japanese side, was reported to be four men killed and 54 wounded. On the Russian side, 62 were reported killed and wounded on the ships and four in the coast batteries.

Another battle had taken place on the afternoon of February 8th, the Japanese fleet under the command of Admiral Uriu sailed into Chemulpo harbor, Korea, with 2,500 soldiers and landed them without opposition from the Russian cruisers, *Variag* and *Korietz*, which were lying in harbor. The following day the Japanese consul at Chemulpo conveyed from Admiral Uriu a message to the Russian commander that he must bring his vessels out of the harber and fight or be attacked where he lay.

The *Variag* and *Korietz* steamed out of the harbor and after a brave struggle against the greatly superior Japanese force, both Russian vessels were destroyed with a loss in killed and wounded reported to be over 500.

These naval engagements were the opening operations of a war destined to be fought with a fierceness unsurpassed in the annals of history.

On February 10th, the Czar issued his supreme manifest in which he expressed his deep solicitude for the maintenance of peace and his regret at the sudden termination of negotiations by the breach in diplomatic relations and then said: —

"Without advising us of the fact that the breach of such relations would in itself mean an opening of warlike operations the Japanese government gave orders to its torpedo boats to suddenly attack our squadron standing in the outer harbor of the fortress of Port Arthur. Upon receiving reports from the Viceroy in the Far East about this, we immediately commanded him to answer the Japanese challenge with armed force."

On the same day the Emperor of Japan issued his formal declaration of war against Russia After giving an account of his government's failure to come to any harmonious agreement with Russia, and stating the conditions which it was necessary for Japan to maintain and the proposals they had made to Russia, he said: —

"Russia, however, never met such proposals in a spirit of conciliation but by wanton delays put off a settlement of the serious questions and, by ostensibly advocating peace on one hand while on the other extending her naval and military preparations, sought to accomplish her own selfish designs. We cannot in the least admit that Russia had from the first any serious or genuine desires for peace. She rejected the proposal of our government. The safety of Korea was in danger and the interests of our empire were menaced. The guarantees for the future which we failed to secure by peaceful negotiations can now only be obtained by an appeal to arms."

Immediately following these imperial manifests, Japan and Russia each issued statements to the world reviewing their positions on the questions at variance. Japan spoke of the importance and necessity to her of maintaining the independence and territorial integrity of Korea, and then stated the propositions she had made to Russia, August 12th, 1894, which were as follows: —

(1) A mutual engagement to respect the independence and territorial integrity of the Chinese and Korean empires.

(2) A mutual engagement to maintain the principle of an equal opportunity for the commercial industry of all nations with the natives of those countries.

(3) A reciprocal recognition of Japan's preponderating interests in Korea, and that Russia had special interest in railway enterprises in Manchuria, and a mutual recognition of the respective rights of Japan and Russia to take measures necessary for the protection of their above mentioned interests so far as the principle of article is infringed.

(4) The recognition by Russia of the exclusive rights of Japan to give advice and assistance to Korea in the interests of reform and good government.

(5) The engagement on the part of Russia to unimpede the eventful extension of the Korean Railway into southern Manchuria so as to connect with eastern China and Shanghaikwan-Newchwangs lines.

Russia, in her official note to the world spoke of her effort to negotiate affairs with Japan, and of the fundamental principle of her policy regarding Korea, whose independence and integrity were guaranteed by previous understandings with Japan and by treaties with other powers, Russia insisted on three points: —

(1) On a mutual and conditional guarantee of this principle.

(2) And on undertaking to use no part of Korea for strategic purposes, as the authorization of such action on the part of any foreign power was directly opposed to the principle of the independence of Korea.

(3) On the preservation of the full freedom of navigation of the Straits of Korea.

She further stated, that the project elaborated in this sense did not satisfy the Japanese government, which in its last proposals not only declined to accept the conditions which appeared as the independence of Korea, but also began at the same time to insist on provisions to be incorporated in a project regarding the question of Manchuria. Such demands on the part of Japan she claimed were inadmissible; for the question of Russia's position in Manchuria not only concern-

ing China, but also all the powers having commercial interests in China, made it impractical. The Imperial government, therefore, saw absolutely no reason to include in a special treaty with Japan, on Korean affairs, any provisions concerning territory occupied by Russian troops.

In view of this, the Imperial government, after charging its representative at Tokio to present its reply to the last proposal of Japan, claimed it was justified in expecting the Tokio Cabinet to take into account the consideration set forth above, hoping that body would appreciate the wish manifested by Russia to come to a peaceful understanding with Japan. "Instead of this," the statement concluded, "the Japanese government, not even awaiting this reply, decided to break off negotiations and to suspend diplomatic relations."

A reply to these statements of Russia was embodied in Japan's statement as follows: —

"The Japanese government utterly failed to see why Russia who professed no intention of absorbing Manchuria, should be disinclined to insert in the convention a clause in complete harmony with her own repeatedly declared principle respecting the sovereignty and territorial integrity of China. Furthermore, the refusal of the Russian government impressed the Japanese government all the more with the necessity of an insertion of a clause to the effect that Japan has important commercial interests in Manchuria, and that politically Japan has interests there by reason of its relations to Korea, so that she could not possibly recognize Manchuria as being entirely outside her sphere of interests."

These reasons decided Japan to absolutely reject the Russian proposal, and in further explanation of its views introduced other necessary amendments in the Russian counter proposal. Among these was a stipulation with regard to a neutral zone, that if one was to be created, it should be established on both sides of the boundary line between Manchuria and Korea with equal width, say fifty kilometers. After repeated discussions at Tokio, the Japanese government finally presented the Russian government a definite amendment on the 13th of October. The last reply of Russia was received at Tokio on the 6th of January.

The firing upon Port Arthur and the naval conflicts immediately following not only led to manifestoes of the belligerent powers, but the United States realizing the situation acted promptly, and Secretary of State Hay, with the approval of the President, addressed a note to the Powers asking their concurrence in a manifesto addressed to the two belligerent nations demanding that hostilities be confined to Korea and Manchuria and that the integrity of China be preserved. This proposition was ratified by all nations concerned. The President of the United States, also, issued a proclamation of neutrality, which in a few days was followed by all the nations of wide influence.

The battle of Chemulpo was the preface of another very important movement. Immediately following it the Japanese landed an army of 60,000 men and occupied the Port. It was an orderly, systematic landing and was accomplished with such methodical accuracy that wounded sailors, who had been rescued from the sinking Russian ships, were taken ashore and cared for by the Japanese Red Cross nurses in a Red Cross hospital, erected after the battle had begun. Two days later the advance guard of 5,000 Japanese occupied Seoul and prepared a camp for those to follow.

Admiral Alexieff, who till then had been Russia's Viceroy in the East, was made the supreme commander of the land and naval forces by the Czar. Evghenyi Ivanovitch Alexieff, who was invested with this absolute authority, was born in 1843 of an Armenian father and Russian mother. He was sent to the United States to take charge of his first ship, the *Africa*. He was post-commander of the Pacific squadron in 1889 and was made Viceroy of the Manchurian territory in the summer of 1903, and held this position until his late promotion at the head of the Russian forces in Manchuria.

At this time Russian troops were concentrated in the chain of forts along the north and west banks of the Yalu River, separating Korea and Manchuria and all along the great Trans-Siberian Railroad. Russian citizens hurried from Japan while Japanese who resided in Russian provinces were eager to get away.

After the withdrawal of Admiral Togo, the Russians began to make preparations for his return and placed submarine torpedoes in the channels of the harbor, where vessels unacquainted with their location could not hope to make their way in or out without coming in contact with one of them and being blown to pieces. The disaster these torpedoes would have wrought upon an enemy was illustrated by the Russian cruiser, *Boyarin*, which ran upon one of these mines and was destroyed and the entire crew of nearly 200 men perished.

A few days before this the transport, *Yenesei*, which was engaged in laying mines, made some mistake which resulted in its destruction, with about the same loss of life. The Japanese made another attack upon Port Arthur, February 17th, and destroyed or injured a number of torpedo boats.

After these disasters to the Russians, an official investigation was held at St. Petersburg, from which it was announced that Russian failure in the Far East was due to lack of preparation, and an appeal was made to loyal subjects to be patient until a force could be amassed that would crush Japan. There, also, seems to have been some dissatisfaction with the manner in which Admiral Alexieff had conducted the campaign up to this time, and the next day General Kuropatkin, who had resigned his office as minister of war in Russia, was appointed to succeed the late Viceroy in command of the land forces in the war zone, and Admiral Makaroff was chosen as commander-in-chief of the Russian sea power. Alexieff continued to represent the Czar in civil administration. Harbin, at the junction of the Trans-Siberian and the Manchurian Railways, was selected as the civil capital, and the two commanders were to take up

their headquarters where the circumstances seemed to dictate. Mukden was singled out as a convenient nucleus of the land forces.

Japan was busy every day landing troops in Korea and moving them on toward the seat of war. While the infantry and artillery were making their way toward Ping Yang and the Yalu River, the naval equipment, under Admiral Togo, kept a close watch on Port Arthur, maintaining the semblance of a blockade and occasionally approaching near enough to bombard the forts on the land or fire a few shots at the ships in the inner harbor. Not much attention was paid to this spasmodic firing until it was discovered the Japanese were attempting to blockade the harbor in the same manner Lieutenant Hobson had attempted to bottle up the Spanish fleet at Santiago. Five merchant steamers loaded with stone and explosives were sunk in this attempt but they were scuttled and sunk just outside the passage and failed to accomplish the purpose.

Admiral Makaroff, who had been commissioned to take command of the sea forces at Port Arthur, was considered one of the ablest of Russian naval officers. He arrived at Port Arthur, March 8th, and took command of the Asiatic squadron. He pursued a different course from that of his predecessors and made preparations for attacking his foe instead of waiting to be attacked.

In a naval sortie, two days later, he inflicted the first loss upon the Japanese fleet, and although it was slight and though his own loss was as heavy as that of his enemy, the fact that he met the invaders half way seemed to quiet the fears of the Russians and imbue them with new hope.

The Japanese, however, continued their intermittent attacks and their attempts to block the channel, in the second of which, they were more successful but still left a portion of the channel clear. In the third attempt they were completely successful, having sunk three steamers in such a way as to close the entrance entirely to vessels of heavy draft.

But the greatest loss of the war to fall upon Russia up to this time occurred on April 13th. Admiral Togo set a trap for his antagonists which was said to have worked with terrible accuracy. He had noticed that every time the Russian fleet returned to the inner harbor it followed a certain course that did not seem to him to be the regular channel. He argued that this was done to avoid submerged mines. On a foggy morning he stationed his main fighting force out of sight of the enemy, but within range of his wireless telegraph communication. The ruse succeeded and as soon as Makaroff's vessels passed beyond the protection of the shore guns, the Japanese reserves attacked them, and Makaroff soon saw that he had stepped into a trap and ordered his fleet to port. As his flag-ship the *Petropavlovsk* entered the channel by the usual out of the way course, a terrific explosion occurred. The ship heeled to one side and sunk in less than three minutes. The Admiral, Rear-Admiral Molas and the venerable war painter Verestchagin, as well as 800 sailors, went down to a watery grave. The Grand Duke Cyril, a cousin of the Czar, who was aboard, escaped with slight injuries, as did also the captain of the vessel. It is thought that while Makaroff was engaging the main body of the Japanese squadron, one of Togo's smaller ships planted a mine in the course he knew the Russians would follow in their retreat. A Russian destroyer was intercepted and sunk, and the battle-ship, *Pobieda*, was badly injured in this fight.

By this time news from the seat of war became chaotic and unreliable. A few facts were known, however, one was that more than one hundred thousand of the Mikado warriors were in Korea, but, besides the fact that a division of this number were off on the laborious march to Ping Yang, absolute silence prevailed as to the whereabouts and the objective points of the other forces. That long march was a severe and perilous one.

While this march was in progress, it was reported that the Russian Cossacks had covered the Yalu River into Korea, and were massing to oppose the advance, but the maneuvers on both sides were kept so much in the dark that war correspondents were not able to give definite facts concerning them.

The Japanese occupied Ping Yang with but little difficulty which, however, was but a station in their onward march. From here they pushed forward for Wiju, near the mouth of the Yalu on the Korean side.

Japan had thus accomplished two of her main objects in the early stages of the war. By her naval victories at Port Arthur she opened the entire coast of the war zone to the uninterrupted landing of her forces and supplies. By her march through Korea which, it was reported, had been accomplished in the most orderly manner and with due regard for the rights of the Koreans, she had established Japanese ascendancy in that country, and put her army in a position to maintain it. On their march to the Yalu, the Japanese were frequently attacked by detachments of Cossack troops which, however, occasioned no serious loss but had a tendency to check their progress. This expedition occupied the period elapsing between their landing on the coast, in February, to the middle of April. A writer of war events thus described the existing condition there and the subsequent action: "Arriving at the river which separates the dependencies of the antagonists, it was discovered that the Russians who had occupied Wiju sometime before, had crossed into Manchuria and occupied strongly intrenched positions among the hills on the opposite side. The Japs gathered in force on the Korean side during the third week of April and prepared for the next move, just as they had for their preceding exploits—methodically, but rapidly. Within the next few days gigantic timbers were hauled and dragged to the east bank. The hill forts on the opposite side kept up a steady fire, but even under it the Japanese constructors continued to work on the pontoon bridge by which it was proposed to cross the river. It must not

be imagined that this was done or attempted all at one point. Their forces extended along the river for eighty miles and scattering the fire of the Russians by several false moves intended to mislead. Aided by small boats from the Jap fleet, the crossing of the three divisions of which the army was composed, was accomplished after six days fighting, on May 1."

The crossing, however, is not what is frequently referred to as the Battle of Yalu, or Japan's first victory. Perhaps it would be more exact to say that the crossing was only a part of the battle. The commanding position of the Russians was the hill at Liu Lien Cheng. Here they were strongly posted, their artillery commanding the town of Antung and the road of the Japanese advance.

To concentrate their forces here and to make it all the more difficult for the invaders, they evacuated and burned Antung and kept up their merciless fire upon the Japs. Seeing the necessity for instant action, General Kuroki, who had successfully directed the crossing, ordered an attack on the hill. Up the steep incline the Japs charged with irresistible force, sweeping the Russians from their guns and hurling them back in full retreat toward Feng Wang Cheng. It was Sunday morning at 7:30 when the battle began. At 9 o'clock the Russians broke away from the fierce bayonet encounter and left the Japs in possession of their position and all their field artillery. In this gallant charge, the Japanese lost 800 men, but the loss they inflicted upon the enemy was even greater, to say nothing of the moral effect of the victory and their gain in just the kind of light artillery they wanted. General Zassulitch, the Russian commander, had been ordered not to risk an engagement but to draw the Orientals further and further inland, it being then the hope of Russia that the Japs would overreach themselves, and getting beyond the reach of supplies and reinforcements, fall into a trap from which they could not escape. Though the Russians had the battle brought to him, he was severely censured by his government, and temporarily, at least, suspended from command. The effect of this battle upon the Japanese mastery of Korea was tremendous. On May 19, the government at Seoul announced the official cancellation of all treaties with Russia, and all concessions made by it to Russian citizens.

This battle on the Yalu River is worthy of note as being the first engagement in which an Asiatic army had defeated European troops. For a time it was feared the effect on China would be to increase her Pro-Japanese tendencies to a point of an alliance with her forces, and, although General Ma, who had twenty or thirty thousand men in Manchuria near the scene of hostilities, had difficulty in restraining his men from making common cause with the Japanese, the latter checked this impulse by immediately requesting the Chinese to maintain the strictest neutrality.

After the battle on the Yalu and some severe fighting at Feng Wang Cheng, the Japanese army separated into four divisions and continued its invasion of Manchuria. While the northern Japanese army was carrying out its plans in the upper peninsula, other forces were operating further south and Admiral Togo continued his attempts to bottle up the harbor at Port Arthur. The ceaseless activity and aggressiveness of the Japs led the Russians to evacuate New Chwang, the open treaty port on the Liao-Tung Gulf at the mouth of the Liao River. This, however, was not as striking an evidence of a realization of their relative weakness, compared with the Japs, as was the destruction of the public improvements at Dalny. The "fiat" city of Dalny had been one of Russia's most cherished treasures in the Far East. It was the port most nearly approximating the ice-free conditions desired. Plans for the construction of Dalny had been issued in 1889 and the edict went forth that it should be made the Russian center of Oriental commerce. The best Russian engineers built its docks, its depots and its public buildings; and its break water and fine stone piers, crowned with warehouses, and its elevators worked by electric power, made it a modern city in every respect. It was the chief terminus of the Trans-Siberian Railroad. It was asserted that $20,000,000 had been spent there before the town was open for occupation and commerce. It was the most striking monument of Russian progress in the Far East. Before leaving, so reports from Petersburg on May 12th said, the Russian garrison blew up the spendid docks and destroyed most of the public property so that it might not be of service to the Japs.

But misfortune was also in store for Japan. Three days after the withdrawal of the Czar's troops from Dalny the first-class Japanese battleship, *Hathuse*, one of the finest of Admiral Togo's squadron, ran upon a submerged mine and was blown to pieces. It was estimated that this and other smaller accidents to the Japanese fleet resulted in the loss of 700 men. A still more serious disaster befell Japanese shipping from a Russian squadron which left the port of Vladivostok, late in April, and captured several desirable prizes as well as the transport, *Kinshiu*, laden with coal for Admiral Uriu's ships. The report was that she had lost her way in the fog and mistaking the Russian fleet for her own ships was taken almost without a chase. The officers and some of the soldiers were captured, but it was said about 100 Japs refused to surrender and went down with the ship fighting to the last.

Shortly after the battle on the Yalu, the Japanese landed troops at Kin-Chow on the Gulf of Liao-Tung, north of Port Arthur, but no decisive action was attempted for three weeks, at the end of which time General Oku had been reinforced and had 40,000 well equipped troops with a good supply of artillery. Engagements following toward the latter part of May were thus described:—

"The great Nanshan hills overlooked the town of Kin-Chow far south-east toward the Korean Gulf. These the army of the defense heavily fortified. The best forces Generals Fock and Zalinsky could muster were stationed

behind the breastworks on the brow of the hill. The Japs had to wade ashore under the fire of the men on the hill. They had such protection as the Jap war-ships could give them and the landing was not much impeded. Then, after a few sorties to determine the strength and distribution of the enemy's forces, General Oku determined to take the hill by direct assault. Under a withering fire his men charged again and again. It is reported that at some points the attacking divisions did not stop in their charge until every man was killed. With unprecedented valor and determination, the Japs persisted and finally took the heights. Their commander admits the loss of 4,200 men, but he thought the victory thus gained well worth the sacrifice. The Russians lost 2,000 men.

"Hoping to release the tension on Port Arthur, General Kuropatkin dispatched General Stackelberg southward with an army of 40,000 men. The movement was partly successful in that it diverted attention from the Port. It was, however, very costly, for the relief forces were met by the Jap commander at Vafangow, about eighty miles north of Port Arthur, and after a three days' fight were disastrously defeated with a loss of 3,000 men. The Japs pursued the unfortunate Stackelberg, who found that the northern army under Kuroki had cut its way so far westward as to menace his retreat. It is estimated that Stackelberg's losses aggregated fully 10,000 men, nor did his achievement amount to anything except temporary relief at Port Arthur."

The Vladivostok squadron, under Admiral Skrydloff, which had made several effective raids on the Japanese ships, again became dangerously active in the month of June. Several Jap transports were waylaid and sunk and in one instance 1,400 men were lost.

Readers of current events were forcibly reminded of the possibility of serious internal troubles in Russia by the shooting of General Bobrikoff, governor-general of Finland, on June 15th. The act was done by one opposed to the Russification policy. This condition of affairs was aggravated by the general depression of trade and business and the deep seated dissatisfaction existing with the government's civil and economic policy, of long standing. But whatever may have been the danger of an insurrection at home, operations at the seat of war were being prosecuted with unabated vigor and long distances were being covered with great swiftness. This will be more remarkable when one stops to consider the rough topography of the Manchurian country, and its great extent. The railroad from Harbin to Port Arthur is 700 miles long. Mukden, which had been the administration capital, is almost 250 miles from Port Arthur. East of the railway is a range of rocky mountains and it is over 100 miles from the mouth of the Yalu to Liao-Yang and Liao-Yang is 210 miles north of Port Arthur. Much of the country is an uninhabitable wilderness, picturesque, yet forbidding with its grim peaks and unexplored passes, making it difficult for both Cossack and Oriental to compass the ends in view.

After the battle on the Yalu and while General Oku was making himself master of all the tip of the peninsula, except Port Arthur, the main body of General Kuroki's forces, under his personal command, advanced along the old imperial road toward Liao-Yang. A considerable force under the command of General Nodzu was dispatched to occupy the land between these two. May, June, and the early part of July were consumed in the tiresome marches through the Manchurian mountains.

In the meantime General Kuropatkin alternated between Mukden and Liao-Yang, marshaling his forces and disciplining the recruits that had been hurried to the front.

By the middle of July, the Japanese advance had brought Generals Kuroki, Oku and Nodzu into close communication, making a combined Japanese army of 200,000 men, stretching in a semi-circle of about 150 miles, extending eastward from the railroad. Its northern point was about twenty miles from the railroad, south of Liao-Yang, through Feng Wang Cheng on the east, to within a few miles of Kai-Ping (or Kai-Chow) on the south.

The Japanese campaign had been carefully planned in Tokio under the veteran Field Marshal Oyama — the head of the war department. He arrived at Dalny, July 20th, and took personal direction of the operations against the Russians as commander-in-chief of all the Japanese armies. He did this with the approval of his government, that he might be on hand with counsel in cases of emergency and be in close touch with the army investing Port Arthur.

On July 28th, another event occurred in Russia which was even more significant of a slumbering insurrection than the assassination of General Bobrikoff, the previous month. Minister of the Interior Von Plehve was blown to pieces by a bomb thrown at his carriage, while he was on his way to a conference with the Czar. This minister was one of the prominent members of the Czar's council and his assassination was but another evidence of the great smoldering discontent of the Russian people.

There was a brief cessation of hostilities after the battle of Vafangow, or Telissu, which engaged the land forces, July 14–15. Neither side evidently considered itself as fully prepared as to forces and position it desired for the supreme test of skill and strength.

General Baron Itei Kuroki, since defeating the Russians along the Yalu River, the first part of May, had taken up his army headquarters principally at Feng Wang Cheng. This general, who had been doing such active work along the Korean border at the head of the first army, was a man who had a thorough training both in the school of military tactics and in the field of actual warfare; and he bore into this campaign all the strategy and foresight of a keen intellect and experienced judgment. He was over 60 years of age during these days of his ingenious and tireless exploits.

General Baron Hokyo Oku, who had charge of the second Japanese army during the summer, was 58 years old. He had landed at different points in Liao-tung Peninsula, north of Port Arthur. From there he went south, attacked the Russians at Kin-Chow and defeated them in the battle of Nanshan Hill. This encounter with Russian artillery lasted 16 hours. The loss reported on the Japanese side was 4,200 men, of

which only 750 were killed. There were 60,000 in the engagement. While a besieging force was holding Port Arthur, General Oku turned north and the remaining Russians fled out of the Liaotung Peninsula followed by his pursuing army. The only engagements of any note during this expedition were at Vafangow and Kai-Ping, the latter surrendering to Oku's troops.

General Baron Michitsura Nodzu had command of the third army which formed the link between the forces of Generals Kuroki and Oku. Before reaching this point in the semi-circle previously mentioned, General Nodzu had gone from his landing place at Takushanon the Korean Gulf and defeated the Russians at Sin-Yen, and then proceeding northeastward placed himself in an intermediate position with the allied forces. General Nodzu was said to be a man of mature judgment and wide experience. He was then in his 63d year.

Only one person prominent among the officers of the Japanese army was under 50 years of age, and that was Prince Fushimi, who commanded the first division of the first army. He was 46 years old May 1st, 1904. Of the generals who have passed the half century mark, in addition to those already mentioned, were Field Marshal Yamagata, president of the general staff, 66 years old; Field Marshal Oyama, commander-in-chief of the armies in Manchuria, 62 years; General Katsura, prime minister, 57; General Sakuma, 59; General Nogi, 54; Generals Nishi and Hasegawa, 53; General Yamaguchi, 58, and General Gentaro Kodama, president of the general staff in Manchuria, 52. The last named officer was a lieutenant-general of Japan, and prominent as a strategist. He began his army career at the age of 13, fighting for the Mikado's party, and during the conflict with China in 1894–95, was vice-minister of war. He was governor of Formosa when the war with Russia broke out, and was immediately summoned to Tokio to superintend the mobilization and transportation of troops.

To turn again to naval operations, it was reported and denied and later the report was confirmed, that on July 22d, Admiral Wittshoeft, the commander of the Russian fleet at Port Arthur, attempted to escape from the harbor, but was driven back by the Japs with the loss of the battleship *Peresviet*, the disability of the battleship *Sevastopol*, and serious injury of the cruiser *Diana*.

The successes achieved by the Russian fleets were due chiefly to the excursions of the famous Vladivostok squadron. The ships, *Rossia*, *Rurik*, *Bogyater*, and *Gromoboi*, accompanied with a half dozen or more torpedo boats, had kept up a continuous raiding after Admiral Skrydloff was made commander, early in June. They were well-built and well-equipped cruisers of high speed and thus were able to make raids and get away before Admiral Kamimura, in command of the heavier, slower-moving Japanese war-ships, could get within effective firing distance. Vice-Admiral Bezobrazoff was the actual commander of the Vladivostok squadron which made so many strategic moves and sudden sorties, but Admiral Skrydloff was the guiding genius that planned and directed its movements.

During the last days of July, several fierce engagements were fought between the besieging land forces and the Russian defenders of Port Arthur. It was reported on frequent occasions that Port Arthur was about to be taken, or, that its fall was certain, still, General Stoessel continued to hold the citadel with but few signs of weakening and no tangible evidence of surrendering. Fighting around Port Arthur continued during the month of August, Japanese dash and bravery being met with Russian obstinacy and tenacity. Nor was the fighting confined to the land, but a number of naval engagements had taken place. Details of the battles almost daily occurring on land and water cannot be stated with accuracy, at this writing, owing to the lack of verified information. The fatalities, as a rule, were heavier on the side of the Japanese, they being on the aggressive and more exposed to the fire of the enemy than the Russians who were mostly on the defensive.

While this was the general conclusion as to the losses of the combatants, the Russians had generally constituted the retreating army. If the frequent Russian retreat had been a part of their scheme in order to postpone the decisive conflicts until they were well prepared for the final onslaughts as well as to secure better vantage ground for resisting their pursuers, their seeming defeats may have consisted more of strategy than of failure.

On the sea, the reverses of the Russians were evidently greater than those of the Japanese. One of the notable victories of the latter was the result of coöperation of land and sea forces. Lieutenant-General Nogi, commander of the besieging army, having captured Wolf Hill, a commanding position two miles outside the fortifications of Port Arthur, poured such a rain of shot and shell into the harbor that to avoid the destructive fire the Russian fleet of some eighteen or twenty war vessels sailed out of the harbor, broke through the Japanese cordon and attempted to get into safer quarters. Admiral Togo pursued the fugitives and a three hours battle ensued in which most of the Russian fleet were destroyed or disabled. The Japanese loss was reported 100 killed and 29 wounded.

Eight days after this engagement, General Nogi of the investing forces dispatched his terms to General Stoessel, demanding his surrender. The conditions he proposed were that the troops should march out with the honors of war with the privilege of joining General Kuropatkin's forces, that all non-combatants should be placed in a locality selected by the Japanese and that all the battleships in the harbor of Port Arthur should surrender to the Japan government. The demand was refused and General Stoessel continued to hold the fortress, while the besiegers renewed their efforts to reduce it.

For some time previous to the events just related, the interest which had all along centered in Port Arthur as the citadel whose fate would decide the fortunes of the war, had gradually begun to spread in other directions, especially after the land forces began to gravitate toward Mukden. But the objective point for the first great battle was not Mukden, but Liao-Yang, about forty miles south of Mukden. It was heavily fortified and was further protected by forts on all sides at an average radius of fifteen miles. The Russian commander, Kuropatkin, had intrenched himself in this stronghold and it was naturally expected that a decisive battle would be fought here, for the three Japanese armies under Generals Kuroki, Oku and Nodzu were narrowing their semi-circle in around the Russian forces and a battle was inevitable. It will be seen that the Liao-Yang battle was the logical sequence of the maneuvers and search for strategic points that characterized the land operations. The result of engagements in the last days of July led the Russians to withdraw to a series of positions ranging from twelve to twenty miles distant from Liao-Yang, the most important of these being Anshan-shan, Anping and Liandiansian. For four weeks the Japanese armies made no more movement. Then on August 24th they began an attack on Liandiansian and Anping and by August 26th they had brought their armies all along the line into action. The losses in these fights were probably 3,000 to 4,000 on each side, and by the 27th and 28th, the Russians were ready to quit and fell back to the fortified plains around Liao-Yang. After a day or two of cessation from heavy firing, the grand attack commenced early on the morning of August 30th. Generals Oku and Nodzu on the south and southeast brought all their artillery into play and found repeated opportunities for bayonet charges. Meantime, General Kuroki, with the Japanese right flank, was attempting to cross the Taitse on pontoons close to Liao-Yang. Finding that too difficult, he sent two divisions across at a ford some twenty miles further up, and on the night of the 31st he was able to transfer his entire force to the north bank of the river on pontoons. Field Marshal Oyama's main object was not so much to capture Liao-Yang as to compel Kuropatkin to face the Jap army for a decisive battle and with this end in view he strove to surround the city in a way that would prevent the escape of the Russians toward Mukden. Kuropatkin, on the other hand, evinced clever strategy in compelling the Japs to scatter their forces as much as possible by retreating from one stronghold to another. The fighting around Liao-Yang continued every day from the morning of August 30th to Sunday morning, September 4th, when Liao-Yang fell completely into the hands of the Japanese and the main body of the Russians were going north. While September 4th marks the closing date of the battle of Liao-Yang, there was by no means a total suspension of active hostilities; for, with the Russian retreat toward Mukden and the Japs in close pursuit to intercept their course, there was almost constant conflict with the rear of the fleeing army. The number of combatants engaged in this battle, computed from the most reliable sources obtainable, placed General Kuropatkin's effective forces at from 170,000 to 200,000 men. The Japanese armies engaged, numbered seventeen divisions of 15,000 men each, or, allowing for inefficients, about 240,000 men. Each division had thirty-six guns, and there were two independent artillery brigades of 100 guns each, making a total of about 800 guns. The estimates of Russian correspondents placed the number of guns ranging from 600 to 1,000 a side. The losses of the battle on the Japanese side were given out authoritatively from Tokio at 17,539 officers and men killed and wounded. Of these Kuroki's army, on the right, lost 4,866; Nodzu's army, in the center, 4,992, and Oku's, on the left, 7,681. Total number of officers killed, 136, wounded 464. Information of Russian casualties was less definite but supposed safe estimates placed the total at 16,000.

This battle, while the greatest of the war, thus far, did not have the decisiveness necessary to make it a turning point in the existing struggle. It is true the Russians, under Kuropatkin, retreated and gave Oyama possession of Liao-Yang; but the retreat was part of the contemplated tactics of the one, and the possession was only part of the achievement hoped for by the other.

Turning again to the scenes around Port Arthur, we find the conflict there continued to rage with unabated fury. The Japanese made attack after attack with a vigor and persistence that evinced an unwavering determination to reduce the fort; while the besieged rallied to the defense with an undaunted bravery or dashed out on their foes in sorties of violence that attested their resolve to fight to the bitter end. Port Arthur is one of the most strongly fortified forts in the world, both by nature and art — a veritable Gibraltar. It is nestled within an enclosure of hills, some of them 500 feet high, resembling an amphitheater, on the tops of which the Russians have erected ramparts of defense, enabling those behind the works to keep at bay an enemy many times their own number. Nothing short of the matchless courage and daring possessed by the Japs and the vital cause that fired their fortitude could have induced an army to persist in assaults against such an impregnable stronghold.

It was estimated by London authorities that the Russian garrison under General Stoessel — excluding non-effectives — amounted to 28,000 men in June, 24,000 in July and 17,000 in September. The Japanese forces under General Nogi were estimated from 80,000 to 100,000 men.

From the meager reports of the almost constant warfare around the fort, it was learned that on August 27, during a violent thunderstorm, the Japanese vigorously attacked the flank positions but were met by a raking fire from behind the fortifications that repelled them. They were also repulsed September 1, in another attempt to

storm a portion of the fortress; but on September 12, they took one of the most important forts on the slope of Golden Hill. This opened another vantage position for attacking the city and added another link to the proposed Japanese circuit within gun shot around the besieged. Another series of attacks began September 19 and continued for four days, the fighting being of an extremely severe character. It was reported that the Japanese had captured nine minor forts, part of them lying close in to Etse-shan and Antszshan and part south of Wolf Hill. These latter controlled the water works of Port Arthur and gave the Japanese a new point from which to make attacks either upon Antszshan to the west or upon the strong Keewan forts to the east. Following the report of these victories were accounts from St. Petersburg of the retaking, by sorties from the forts, of the positions gained and terrible slaughter of the Japanese. In one instance it was reported that in a Russian sortie on a Jap position held by 4,000 men all the latter were killed but one non-commissioned officer and eleven men. The Russian estimate of Japanese losses for four days fighting was put at 20,000. During the series of attacks the Russians attempted to recapture Itzeshan by a detachment from the garrison but were repulsed with heavy loss. On September 24–25, the Japanese made repeated and daring attempts to capture a high hill at Port Arthur and being in an exposed position the Russian machines swept them down in masses, but more troops followed and with nothing daunting, leaped over the dead bodies of their comrades and faced the galling fire from the forts until they enticed the Russians to make a sortie; and when the latter came out from under their shelters, the Japanese turned their machine guns upon them with terrible havoc. Next morning the hillside was strewn with mangled Russian and Japanese bodies.

While the wavering fortunes of war were swinging between Russ and Jap around Port Arthur, on sea and land, portions of the armies in the north were coming together in skirmish sallies, rear attacks, routs and repulses, as the forces were marshaling for another great battle. A notable change in the general tactics of the Russian army was made, October 2, when General Kuropatkin decided to assume the offensive.

The scene of the impending conflict lay between Liao-Yang and Mukden and in the vicinity of the rivers Hun, Taitse, Schili and Shakhe, the general course of the first being south, the second south, then west and the two latter west; the last three emptying into the Hun. In compliance with Kuropatkin's orders, the Russians began to make occasional forward movements. His eastern advance guard was in the vicinity of Bensihu and on October 8th crossed Taitse River. Rentsiaputze, southeast of Mukden, and Shakhe, on the Mandarin road were occupied on the 9th, and further advances were made on the 10th. That night, however, Oyama decided it was time to strike and early in the morning the great battle near Yentai mines was begun

A general engagement lasting nine days followed, resulting in heavy losses on both sides and closing on the 19th on account of heavy rains and impassable roads. Engagements took place on a line between fifty-five and sixty miles long, and the line of battle proper, where the fighting was severe and continuous was twenty-five or thirty miles long. The Hun River on the north and west and the Taitse on the east and south mark out the field in a general way. General Kuropatkin utilized every military resource available Russia had in the Far East. Estimates of his strength ranged from 200,000 to 250,000 men.

October 10th, Kuropatkin, in full force crossed the Hun River where it flows easterly, south of Mukden. The next day a larger force crossed the Schili and the fighting that day was very severe to the north of Yentai. General Nodzu took the offensive October 11th and began to force the Russians back. October 14th General Oku's forces, which came from the Liao River and crossed the Hun for that purpose, turned the fortunes of battle towards the Japanese. On October 17th, the Russians made some gains in the prolonged battle. The most notable was the occupation of Lone Tree Hill and the attempt of the Japanese to recapture it was a gallant and brilliant feat of arms. Victory fluctuated from side to side and on the cessation of the firing neither side could claim decisive and permanent gains. Losses on both sides were estimated from 40,000 to 65,000 men. This engagement was called the battle of Shakhe, or Sha, River, and in some respects was one of the most remarkable battles of modern history. Its particular feature was the long-continued test of endurance on both sides. Men fought without sleep, even without rest, day after day.

For several weeks following the exhausting battles on the Shakhe, the forces on both sides refrained from active operations for the purpose of recuperating their losses, although each of the commanders, Marshal Oyama and General Kuropatkin, made frequent feints with a view of finding his adversary's weaker points. At times the two armies were drawn up so close to one another that the outposts were said to engage in petty trade, and have contests in wrestling and boxing matches. Winter weather was prevalent through November at the scene of conflict, but food, clothing and other supplies were sufficient, and on both banks of the river, trenches and bomb-proof retreats had been dug while each of the vast armies was waiting and watching for a favorable opportunity to attack the other. Both sides received reinforcements and supplies for future emergencies; the Japanese hopefully looking forward to the fall of Port Arthur, when they would receive the accession of General Nogi's forces to augment their ranks for the next aggressive campaign, and the Russians utilizing the Trans-Siberian railway to its full capacity in hastening recruits and provisions to the base of operations.

The recall of Admiral Alexieff to St. Petersburg, about the middle of November, left General Kuropatkin in full command of the Czar's military

and civil subjects in the Far East. General Linevitch, who up to that time had been in command at Vladivostok, was given charge of the First Army, while the Second and Third, respectively, were to be placed under the commands of Generals Grippenberg and Baron Kaulbars. With this re-organization of the Russian forces and their complete equipment for vigorous action, the Czar expressed the belief that his gallant soldiers were about to inaugurate a campaign that would administer the crushing blow to Japan. But the Japanese, neither dismayed by their enemy's recuperative strength nor willing to yield a single point, were alert to every movement and ready for any emergency. They had planned from the first, among other things, to absolutely checkmate the tendency of Russian domination in Korea, limit Russian influence in Manchuria, capture and re-possess Port Arthur, and no obstacles or opposition could swerve them from their purpose. During the last part of the year 1904, no decisive engagements had taken place between these two armies, although frequent skirmishes, as straws show the direction of the wind, indicated a converging of battalions for a Titanic struggle in the vicinity of Mukden. In the meantime, attention was being riveted on the desperation surrounding the investment of Port Arthur

The Fall of Port Arthur.

A coherent narrative of any one center of activity, in a great war, is often impossible, except by a partial recapitulation of events previously mentioned in a contemporary review of the whole field of operations. The momentous consequences hinging on the fate of Port Arthur justifies such a repetition, along with the elucidation of other facts. Among the prominent occurrences after the attack on the Russian ships off Port Arthur by Admiral Togo's torpedo fleet, February 8, 1904, were the naval exploits as previously detailed up to March 8, the arrival of the Russian Admiral Makaroff at Port Arthur, and his active naval warfare from March 9, to April 13, when he went down with his warships under the fire of the Japanese naval guns.

May 10.—Admiral Togo bombarded the city from behind hills to the westward, and May 26–27, Kinchow and Nanshan Hill were captured, cutting off Port Arthur from the Russians. May 30, Japanese took possession of Dalny. June 14–16, General Stackelberg, advancing to the relief of Port Arthur, was driven back by General Oku, at the battles of Wafangkau and Telissu. June 23–24, sortie of Russian squadron failed. July 10, Japanese torpedo boat attack repulsed. Japanese occupy Kinsan heights. July 22, Fourth Japanese army landed at Port Dalny. July 26–28, fierce combats on land and sea resulted in the Japanese taking Wolf Hill. August 10, dash of the Russian fleet and fight with Togo's ships; vessels of the former damaged and scattered. August 14, cruiser *Rurik* was sunk in Korea Straits by Admiral Kamimura's squadron and fierce fighting at Port Arthur continued. The next day, Sushiyan, Long Mountain and White Wolf Hill were captured, completing the Japanese envelopment of the fortress. August 16, General Nogi suspended operations and made official demand of General Stoessel to surrender, but on the following day the latter sent back his refusal and fighting was resumed. August 18, the Japanese captured several Pigeon Bay positions. August 21–22, Panlung Mountain, and on August 27, Russians attacked entire Japanese line and were driven back.

After the capture of Wolf Hill by the Japanese the latter part of July, an eminence within two miles of the inner fortifications of the city, and from which the heavy siege guns could bombard the city, fire into the harbor and disperse the Russian fleet, it was not thought Port Arthur could remain more than a month longer in the hands of its brave defenders. But General Stoessel, commander of the beleaguered forces, evidently did not share this opinion. He knew that, although the Japanese had won a number of advantageous positions, despite galling fires and powerful fortifications, that they would have to overcome a still greater number of formidable obstacles before they could wrest him from his stronghold. For every outpost yet taken there were half a dozen others still more forbidding and dangerous of approach. With every pass between mountains guarded with batteries and field guns; with forts surrounded by intrenchments and electrified barbed wire, contact with the latter being extremely dangerous, if not fatal; with deep and wide moats, for trapping the venturesome enemy and along these occasional caponieres constructed, from which hiding places sharpshooters could pick off assailants at leisure; with torpedoes under outposts and machine guns behind walls ready for instant action; with not one but a dozen or more lines of fortresses equipped with all the diabolical engines of death known to modern warfare, still to be met and captured, and, back of all these equipments of defense, with a band of men, brave as the bravest, ready to contest every inch of the way with invaders, there was plausible ground for General Stoessel's hope of final success. Such were some of the obstacles the Japanese had to meet and overcome before entering the Gibraltar of the Far East.

It was estimated from reports of the numerous conflicts, consequent upon storming the forts surrounding his objective point, that General Nogi lost 25,000 men, during the month of August. Undaunted by repulse and fearless of death, the Japs struck blow after blow, not alone with the stolid tenacity that knows only "to do and die," but with all the tact and strategy determination could inspire or ingenuity devise. Yet it was an unequal struggle with a concealed foe whose allies were underground mines, treacherous traps and live wires. The overland attacks were too costly in human lives, if other means could be devised to lessen the slaughter while accomplishing the end. President-of-the-Staff Kodama and General Nogi put their ingenuities to the test and the result was

a scheme to tunnel and trench passageways to the inner fortresses and incidentally undermine and blow up the monster forts. Engineers gave directions and a hundred men with pick and shovel — all that could work at one time — were detailed to begin. Operations had to be carried on in the darkness of night and with the utmost caution and quietness. Many fell victims to the enemy's bullets, but others were ready to fill their places and take turns with the fatigued, so that the full quota was always at work. For two months or more the work of tunneling the mountains and zigzagging the valleys with trenches proceeded with unabated vigor, while advanced positions on the ridges, far beyond the click of the pick, were being held and other conquests made with dogged persistence. Through these tunnels and intrenchments, army ingress to vantage positions was effected with comparative safety and hastened the final consummation in view.

On September 19–20, the Japanese made another general bombardment, and, along with other fortifications, took Forts Suishiyeng and Kuropatkin. A week or ten days later, the Russian fleet in the harbor was bombarded and the battleships *Poltava*, *Peresviet* and *Pobieda* were hit several times. During the latter half of October, beginning on the 16th, another fierce bombardment was carried on, during which the Japanese stormed and captured a fort on Rihlung Mountain and engaged the Russians on Shungshu Hill in a lively combat. On October 24, the Russians dynamited the Japanese in their trenches east of Keekwan Mountain. The Shungshu, Rihlung and Keekwan forts were bombarded on the 26–29, causing great destruction to the defenses. The Japanese having stormed Etse Mountain on the 5th of November, were repulsed the next day with heavy loss. On the 13th of the same month, the Russians, in a desperate nocturnal sortie, attacked the Japanese, with the result of heavy losses on both sides. November 22, a position on Etse Mountain was captured by the Japanese, and on the 26th they entered the interior works of the forts, Rihlung, Shungshu and Keekwan, but were driven out. Among the important positions around Port Arthur taken and held by the Japanese during the siege and series of battles of the fall months, the climax was reached in the capture of 203-Meter Hill the last day of November. This eminence dominates both the harbor and the city, and its occupation by the Japanese practically sealed the doom of Port Arthur. No battle had been fought with more fierceness and determination, and the loss of men to General Nogi was the greatest he had yet suffered in a like period of time, the estimate being 15,000 in four hours. To the casual observer it seemed like a victory dearly bought, owing to the difficulty of mounting guns on its rugged heights, but to the Japanese it was the priceless vantage ground they were determined to have at any cost. Once in their possession, they began to haul up their artillery with ropes; 800 men to a gun, it was said, was required to take them up the steep acclivities and mount them for action. They got them in positions, where, by a dexterous use of the hyposcope, they could fire into Port Arthur and shell the harbor. The Russian warships, under Admiral Wirenius, lay in the harbor, and, after forty-eight hours' bombardment, December 6–7, from 203-Meter Hill, the battleships *Pobieda*, *Retvizan*, *Peresviet* and *Poltava*, the cruisers *Bayan* and *Pallada*, and the gunboats *Giliak* and *Amur* were destroyed and sunk. One battleship was left afloat, the *Sevastopol*, but two Japanese torpedo boats ran it down several days later and disabled it, and thus completed the destruction of Russia's navy at Port Arthur.

A few gunboats and destroyers had escaped, and some hospital ships and transports were still in the harbor, but the fighting force was effectually wiped out. The Japanese torpedo boats, which disabled the *Sevastopol*, were afterwards lost, and the Japanese cruiser *Saiyen* was, on November 30, destroyed by a Russian mine, which sums up the Japanese naval loss during this period.

The garrison at Port Arthur, notwithstanding the Russian reverses, still held out, and fought desperately to forestall further invasion by the enemy. December 7, General Stoessel made a bold attempt to recapture 203-Meter Hill, and was said to have lost 3,000 men in the sortie, the attack ending in failure. But General Nogi's undertaking was not yet completed, and he fully realized, before capturing 203-Meter Hill, that with that in his grasp, there would be more battles to be fought and ramparts to be taken before the gates of the city would open to receive him. The tunneling and trenching that had enabled him to get parts of his army in positions of advantage, that otherwise would have been impossible without appalling loss of life, had a counterpart in the sapping of forts instead of the hazardous and sanguinary method of open attack. The undermining and blowing up of East Keewan fort illustrate the process of sapping. The Japanese had possession of a battery near where East Keekwan stood dominant, grim, demon-like, defiant, unapproachable. The engineers started straight down through the solid rock. It was a long and irksome task; for only a few men could work at a time, and then only when the trench from which they operated was protected by their comrades against onslaughts from the garrison. In spite of the incessant and vigorous firing kept up by the sentinels on guard, to keep down the garrison, the Russians would occasionally break forth in midnight attacks, or whenever they had hope of catching the sappers unaware, but the work went on for more than a month, when, hounded and harassed by day and night, a shaft was at length sunk 40 feet deep, and then a tunnel across under the level of the galleries of the fort until the right point was found for placing dynamite. Two such tunnels were dug, and enormous quantities of explosives were taken in and ingeniously disposed. It was the 18th of December; all was quiet in the deep

dug-out where men had hid, crawled, labored, struggled, suffered, and endured, to realize one supreme moment, to break another link in the chain of anchors holding Port Arthur. Silently the engineers withdrew from the termini of the tunnels, ascended the dark shaft, saw that wire connections were made and, giving assurance that all was ready, a button was touched, the earth shook; rocks, timbers, cannon, bodies, arms, legs, in one chaotic mass flew far into the air, and then settled back on a heap of ruins, over the foundation of the once impregnable fortification. Another fort fallen, another stronghold taken, another barrier removed from between the Japanese army and its goal.

Other forts still remained to bar the way of the invading forces, but the mines, the tunnels and the trenches, mute evidences of resolution as well as artifice, were being extended and, most important of all, the invincible Jap, the faithful, courageous boy of the island nation, glad to live and fight or fall and die for his native land, it was he who made Japan triumphant through all the trying ordeals of a fiercely-fought siege. From one tier of embattled heights to another, from mountain-locked fort to improvised barricade, from moat to parapet, the Japanese soldier was now everywhere in evidence, breaking through the outer cordons and hastening on to storm the innermost citadel. On December 24, the heights east of Houyangshukou were captured and, following the taking of several minor positions, occurred the final fruitless struggle of the Russians to hold Rihlung fort on mountain of same name, December 28, the capture was made after months of fighting, sapping and mining. The Japanese had placed seven dynamite mines under the front wall, and through the breaches made by the explosions, a large body of Japanese troops charged under cover of a tremendous bombardment and captured the first line of light guns, and constructed defense works despite the enemy's fierce fire. The first charge was made at 10 A.M., and at 4 P.M., their occupation being practically assured, they charged and occupied the inner lines of heavy gun position, subsequently dislodging a remnant of the enemy's force and stubbornly holding the gorge fort, which they occupied until they captured the entire works.

Rihlung fort, situated on Rihlung Mountain, formed part of the inner circle of the chain of forts defending Port Arthur. Rihlung is situated about two miles from the outskirts of the city from which it bears due northeast and is a mile-and-a-half southeast of East Keekwan fort taken on December 18. The possession of these two forts made a most important breach in the fortifications of Port Arthur and cut off communication between the Golden Hill forts and the forts of the western section of the inner circle of fortifications. On December 31, Shungshu fort, another important stronghold, was taken by storm.

These sweeping conquests, following in the wake of the great victory of 203-Meter Hill and the destruction of the Russian fleet in the harbor, foretold the speedy and inevitable fall of Port Arthur. It was now the fifth day of an assault that had been kept up without ceasing within the fortifications of the doomed garrison. The Russians, in the last throes of desperation, fought like enraged tigers and the Japanese, stimulated by success and bent on administering a final effective blow, rushed like maddened demons into the jaws of death to wrest the last hope from their valiant foe. At 6 in the evening of December 31, an assault on the whole eastern side was renewed with terrific vehemence. A mine made an opening in the side of "H" Fort, and the Japanese infantry, piercing the covered way, rushed in. Fighting lasted all night, the Japanese pushing against the whole ridge simultaneously. The Russians resisted every point but were slowly driven back. The new year broke with the antagonists still locked in conflict, and dawn broke before the resistance had ceased. Then the Japanese had firmly stationed gun positions on Panlunshan and the fort. The city was now open to the Japanese at this point, for the remaining defenses were slight and temporary. At 9 o'clock in the morning, the first center left column attacked Wantai. Nogi's artillery was cleverly used to screen the advance, and by using its protection, the Japanese reached the fort, but so stubborn was the resistance that not until 3:35 o'clock in the afternoon did the Japanese fully occupy the position, fighting of the fiercest character having been maintained for over six hours without ceasing. Attacks on the forts to the southeast were carried on simultaneously and soon after midday, January 1, there came an explosion in Kinkishan fort. The Russians there immediately opened a heavy rifle fire, which soon ceased. The Japanese scouts advanced and found the enemy evacuating the position. The slacking of fire in the northern and western forts indicated that the Russian ammunition was failing. Wherever there was a garrison, a fort in the hands of the Russians or a squad of soldiers there was fighting — firing, bayonet charging, stone hurling, hand-to-hand combat; the garrison positions becoming more and more desperate and hopeless. Late in the afternoon the counsel of officers prevailed upon General Stoessel to surrender. Regretfully but inevitably he approached the crucial moment, but the decision to yield was made, and at 5 o'clock Sunday afternoon, January 1, 1905, Port Arthur passed from Russian into Japanese possession.

General Stoessel at once dispatched a Russian messenger, bearing a flag of truce into the first line of the Japanese position before Port Arthur, who handed a letter to the Mikado's officers, containing an offer to surrender, as follows:

"Judging by the general condition of the whole line of hostile positions held by you, I find further resistance at Port Arthur useless, and for the purpose of preventing needless sacrifice of lives, I propose to hold negotiations with reference to capitulation.

"Should you consent to the same, you will please appoint commissioners for discussing the order and conditions regarding capitulation, and also appoint a

place for such commissioners to meet the same appointed by me.

"I take this opportunity to convey to your excellency assurances of my respect. STOESSEL."

The Japanese acceptance was returned in the following words:

"I have the honor to reply to your proposal to hold negotiations regarding the conditions and order of capitulation. For this purpose I have appointed as commissioner Major-General Ijichi, chief of staff of our army. He will be accompanied by some staff officers and civil officials. They will meet your commissioners January 2, noon, at Shuishiying. The commissioners of both parties will be empowered to sign a convention for the capitulation without waiting for ratification, and cause the same to take immediate effect. Authorization for such plenary powers shall be signed by the highest officer of both the negotiating parties, and the same shall be exchanged by the respective commissioners. I avail myself of this opportunity to convey to your excellency assurances of my respect. NOGI."

As soon as word of Stoessel's surrender could be communicated to the firing lines, hostilities were suspended and the demons of an hour before, shooting, wounding, slaying, were transformed into veritable angels of mercy, helping, nourishing and relieving, regardless of friend or foe. General Nogi received the note from General Stoessel at nine o'clock of the same day it was written and immediately sent back his reply. The capitulation commissioners met January 2, according to appointment, and arranged terms of surrender. The terms stipulated that the Russian army and navy should be permitted to retain their swords and return to Russia on signing a parole not to take arms during the continuance of the war; that all Russian soldiers, marines and civil officers of the garrison and harbor be made prisoners; that all forts, batteries, vessels, munitions, etc., be transferred to the Japanese in the condition in which they existed at noon, January 3; and that for the benefit of the sick and wounded Russians, the sanitary corps and accountants belonging to the Russian army be required to serve under the Japanese sanitary corps for such time as may be deemed necessary. The terms were accepted and in a few days afterwards Japan took formal possession of the city and its belongings.

The losses sustained in the siege of Port Arthur will probably never be accurately written on account of the intricacies attending the operations, the number of attacks and repulses and the lack of reliable statistical reports. One correspondent claims that 75,000 men died in the struggle and that three times that number suffered from wounds. Oyama reported that the total loss of the Japanese during the five months' siege, beginning with August, was 50,000, and the Russian loss about half that number, these estimates including the killed and disabled. There were many losses not included in the sum totals, lost in battles and attacks, for there was almost constant firing and counter firing and shelling in which no reports were made of losses. It was estimated that the Japanese fired 2,000 tons of shells into Port Arthur, amounting in value to over $30,000,000. The Russians used about the same amount of ammunition in defending themselves. General Nogi's forces during the siege were variously reported, at different times, from 100,000 to 70,000 men. Some statistics regarding the Port Arthur forces under General Stoessel, made the army originally number 35,000. Of these, it was said, 11,000 had been killed, 16,000 wounded or sick and 8,000 remained in the forts, of whom 2,000 were unable to fight. After the surrender, it was said the prisoners numbered 878 officers and 23,491 men, which would indicate a larger fighting force in the Port Arthur garrison than had been given out. On this basis and other data, one correspondent estimated that General Stoessel had, at the beginning of the siege, an army of 75,000 men. The Russian estimate of Japan's expenditure of money to take the fortress was placed at $100,000,000. Russia's expenditure in defending it was probably not much less, and in addition to the actual outlay in maintaining the garrison and its supplies, connected with the loss of Port Arthur, was the loss of seven battleships and the other complement of a fleet worth something near $100,000,000. Russia also lost the fine modern city of Dalny upon which she had spent $125,000,000, and Japan possesses this rich prize of war. Russia lost and Japan gained one of the most elaborately constructed fortifications in the world, and likewise another modern city at Port Arthur, on which an outlay of $250,000,000 had been planned by the Russian Empire and on which $140,000,000 actually had been spent when Admiral Togo hurled his destroyers against the squadron in the harbor, February 8, 1904. Russia lost and Japan came into possession of the railroad, with its branches, from Port Arthur to Liao-Yang, another item running into millions in favor of Japan.

The memorable siege of Port Arthur may be said to have begun with the attack of the fleet by Admiral Togo, but the investment proper had different stages of intensity, and was most desperate during the last five months of the siege. History, however, will doubtless record it as one long, brave assault and valorous defense, of unparalleled human daring and sacrifice, from February 8, 1904, to January 1, 1905. In recording it as one of the momentous sieges of the world, facts will also demand that it be designated as one of the most heroic; for never before did indomitable warriors cross swords with greater fortitude and daring. Never before did men confront men with such mighty engines of destruction on one hand, such colossal and artfully contrived works of repulse on the other.

Sieges of the past have stamped their impressions on the records of time—Troy, Carthage, Antwerp, Sebastopol, Richmond, Paris and others. Deeds of heroism celebrated in immortal verse; maps of nations changed; epochs in history made. Greater things than these may follow the strife which has accentuated the tragic horrors of war, the magnificent valor of the soldier and the noble character of the victor in the siege and capture of Port Arthur.

A GENERAL LULL in activities followed the

capitulation proceedings, after the clash of arms that ushered in the New Year at Port Arthur had died away. This was true of both land and sea operations, and while the armies in Manchuria were watching each other with eagle eyes, the characteristic calm that follows a great storm for a time prevailed; although there was not an absolute cessation of hostilities. Some talk of peace was noised abroad and diplomats of leading nations believed the time opportune and expressed hope of such a consummation. Japan manifested a willingness to negotiate, if the initiative were taken, but Russia, humiliated by defeat, and still resting on the hope of final victory, gave but little encouragement to a conference in which terms — however generous they might be — would be dictated to her by a smaller, if not a weaker, nation.

During the greater part of January and into February there had been but few engagements of importance between the armies of Oyama and Kuropatkin, and less general activity than at any other period succeeding the battle of Liao-Yang. The Russians were increasing their forces and the imperial budget issued at St. Petersburg showed that $310,500,000 had been set aside to prosecute the war in 1905. General Nogi and his 100,000 veterans of Port Arthur had gone to the northern scene of conflict and by the middle of February, had re-enforced Marshal Oyama's army, thereafter to be known as the Fourth Japanese Army. The other three Japanese armies maintained the same relative positions in which they had fought their way from Hai-Cheng northward. In addition to these four large armies, a fifth army had been organized under the command of General Kawamura whose operations were then in the vicinity of Vladivostok. The Japanese had rushed up their heavy artillery to employ it against Kuropatkin's army, and a considerable increase had been noticed in the range of fire.

Referring to the leading occurrences in Manchuria during the mid-winter period, it was observed that the Russians did considerable bombarding on the Japanese lines but without striking any very effective blows or protracting an attack long enough to enlist a general engage ment. While the Japanese were still celebrating the victory at Port Arthur the Russians turned their guns on them at favorable points; a significant reminder that the war was not over yet. January 8, General Mistchenko, with about 3,000 mounted Cossacks, crossed the Hun River and went south on a raid for the purpose of cutting off the Japanese lines of communication. He succeeded in capturing a few small transports and in cutting the railroad and telegraph lines in some places, but the damages done were soon repaired and in nearly every instance, when his troops encountered the Japanese forces, they were compelled to retreat. The casualties of the raiders were much greater than those inflicted upon the enemy. On January 29, the Russians bombarded the Japanese at Sandepas and suffered a defeat. February 1, there was some fighting along the Hun River, but without any decisive results. On the 8th, the Russians made a raid across the Taitse, attacking a division of the Japanese army, but returned before either side had a chance to score a success. On the 14th, the Russian cavalry, 9,000 strong, advanced to attack the Japanese army and attempted to cross the Hun River and move on Heikoutai. The Japanese mounted heavy field guns and opened fire on the Russian front, repulsing several attacks. The immense armies of Oyama and Kuropatkin were now fronting each other along the Shakhe and as the attacks became more frequent and vigorous it was evident a general engagement was imminent.

The Battle of Mukden.

While it is difficult to set a precise date for the beginning of the battle at Mukden, February 23 may be designated as the day on which the series of battles that had involved various sections of the forces assumed the proportions of a general engagement between the two great armies.

The generals engaged in this battle were, Japanese: Kuroki, Oku, Nodzu, Nogi and Kawamura; Russian: Linevitch, Kaulbars, Rennenkampf, Bilderling and Stakelberg. Both Russians and Japanese were within a few miles of Mukden, the sacred city of Manchus, which has an estimated population of 250,000. It lies in a plain bordered on the west and southwest by the Hun and Liao rivers. Before the general engagement began, the Russian and Japanese lines had formed a huge bow or crescent, the Japanese to the southward, extending over a hundred miles of plains and hills, from Chang-Tan eastward across the railway to Lone Tree (Putiloff) Hill. Almost all the strong positions were held by the Russians. On the 23rd of February the Japanese armies were attacking the Russian front nearly all along the line. Kuropatkin had massed a large force on the Russian left in an attempt to turn Kuroki's position, but had been outflanked and was compelled to retire from the Shakhe. On the 24th, the Japanese closed in on the Russian left flank and the Russian outposts were driven into the main positions.

The Japanese attack on Beresneff Hill against the Russian left flank, February 25, developed into an encounter of the most sanguinary nature. The Japanese pressing forward on a bayonet charge, were received with pyroxylin hand grenades, or were blown up by buried mines, and the Japanese machine guns, which took positions to support the advance, were silenced for a time and beaten back. The Japanese, however, recovering, pressed on with greater resolution, and the Russians finally yielded the hill in face of greatly superior numbers and a determined series of attacks which continued night and day.

Some of the leading features of the battle after the capture of Beresneff Hill, occurring on the three successive days, beginning February 27, were the hard fighting on the eastern flanks of the armies, a part of Kuroki's troops crossing the Shakhe River, a general battle going on along the whole one hundred miles of front occupied by the two

armies, and Kuropatkin's reply to General Kuroki's attack on the Russian left by a counter attack on the Japanese left. Up to March 2nd, the Japanese continued the attack against the Russian positions on the Shakhe, and on that day drove in both flanks and advanced on Lone Tree (Putiloff) Hill. The next day both wings of the Russian army crumpled toward Mukden; the Japanese pressed hard on the center, and Kuropatkin began to withdraw toward Tie-Ling, having already removed a large part of his stores from Mukden. The next day another step toward final victory was made by the Japanese breaking the left wing of the Russian forces, crumpling up their right and encircling them. This envelopment movement was a pronounced success, and on March 6 there was an attack along the entire Japanese line, and the battle raged in a great arc around Mukden. On the 8th of March Kuropatkin had abandoned his positions south of Mukden, and the Japanese were attacking the city from all sides. The next day fighting continued north and northwest of Mukden, and on March 10, Mukden fell into the hands of the Japanese.

Oyama reported that the Japanese enveloping movement had been entirely successful and that along with Mukden, Fu-Shun and immense quantities of stores, guns and ammunition were captured. The capture of Mukden virtually ended the great battle that had raged for full fifteen days, not counting the numerous attacks and repulses and bombardments for days preceding the general engagement.

The battle of Mukden may be set down as the greatest of the world's history in the number of men engaged, the extent of the battle line and the long duration of the fighting, and it may justly be rated, too, as one of the greatest in the importance of the issues at stake. Some writers compare it in rank and decisiveness with Waterloo, Austerlitz and Gravelotte. The Japanese attack had been pushed with a determination and a disregard for suffering and death that gave it a distinction even in this remarkable war. It was said of General Nogi's veterans, who won special honors in the engagement, that when they charged the center, they shouted in Russian: "Out of our way! We are from Port Arthur!" The victory over the Russians, who held out with all the traditional tenacity characterizing their career, is another compliment to the superb generalship of Oyama and his invincible army. The whole number of men engaged in the battle were in round numbers, Japanese, 500,000, and Russians, 325,000.

The Russian losses, officially reported for the battle, were 107,000 men. Japan's losses were about 42,000. The Russian prisoners Japan held at this time, including the captives taken at this battle, numbered 95,000.

The next day after the engagement, March 11, the Japanese continued a vigorous pursuit of the Russians. The former advanced north from the vicinity of the Pu River and, immediately after their departure, engaged with a large column of the latter retreating north. After a hand-to-hand battle, the Japanese captured the column. On the same day Kuropatkin reported that his retreat on Tie Pass had progressed so favorably as to put his armies out of danger, but that the Japanese were still hanging on his flanks and a continuous rear-guard action was being fought. Following up the retreating forces, Marshal Oyama planned to capture the entire Russian army, but Kuropatkin, exercising his usual strategic skill in tactical retreats, succeeded in eluding his wily foe. By March 20, the retreating Russian army had reached a point 27 miles north of Tie Pass, with the Japanese still in pursuit but not near enough to harass them.

On March 17, the Czar recalled Kuropatkin and put General Linevitch in his place as commander-in-chief of the Russian forces. General Kuropatkin then magnanimously volunteered his services in the field and was given command of the First Russian Army.

From March 21 to the end of the month, the Russians continued their retreat leisurely, progress of their march being considerably impeded by the ground thawing, making it difficult to move guns and transport wagons. During the month of April, active hostilities were but little in evidence. General Linevitch established headquarters in Harbin, concentrated some of his forces at Chang-Chun for the defense of Harbin, sent a detachment of 5,000 to guard Kirin, and entrenched a large army at Swantsanhei. Oyama moved a part of his armies against Vladivostok on the east and another detachment to Tsitsihar on the west. His activities in Manchuria, eastward of Harbin, toward the latter part of the month, gave rise to the belief that he was about to resume the offensive.

The Baltic Fleet.

There was a long cessation of naval engagements after the series of battles, on water, during the first half year of the war. During the interval of peace on sea, interest was centered in the next step Russia was taking to regain her lost prestige. In view of the non-effectiveness of her Pacific fleet, she hastened preparations to send the most formidable vessels of her Baltic fleet to the Pacific. Early in September, 1904, arrangements were made for the fleet to start from Kronstadt and, on the 11th of the month, it sailed out of port, but stopped at Reval, where it remained for a few weeks.

This Russian Baltic fleet, ordered to the Far East, consisted of three divisions. The first division under Admiral Rojestvensky, included the battleships *Sissoi*, *Veliky* and *Navarin*, the cruisers *Junstchug* and *Almaz*, six destroyers and eight transports. In the second division were the cruisers *Oleg*, *Izumrud*, *Kuban* and *Terek*, and the auxiliary cruisers *St. Petersburg* and *Smolensk*, which were renamed *Run* and *Dneiper*, with five destroyers. The third division was composed of the battleships *Kniaz*, *Suvaroff*,

Borodino, *Imperator Alexander III*, *Orel* and *Ossliabia;* the cruisers *Admiral Nakhimoff*, *Dmitri Donskoi*, *Aurora* and *Svietlana*. The squadron as a whole was composed of so many different types that it lacked that homogeneity which tacticians of the modern school consider to be of prime importance to the effectiveness of a fleet. As an offset to this defect, it contained among its vessels four battleships which were considered, in some respects, the best in the world. They were the *Borodino*, *Orel*, *Imperator Alexander III*, and *Suvaroff*. Each carried four 12-inch and twelve 6-inch guns, besides a numerous battery of smaller rapid-fire pieces. The heavy guns were protected by 11 and 10 inches of armor, and the six turrets containing the twelve 6-inch guns in pairs, carried six inches of armor. Theoretically, these ships are unsinkable by gun fire at ordinary battle ranges.

The length of the journey undertaken by the Baltic fleet equals more than half the distance around the globe, being 12,270 nautical miles and 14,110 statute miles by the shortest possible route on water from Kronstadt in Finland Gulf to Port Arthur in the Yellow Sea. The general course taken was from Baltic Sea to North Sea, south to Strait of Gibraltar, across Mediterranean Sea, through Suez Canal to Red Sea, then Arabian Sea, Indian Ocean, Pacific Ocean, and Yellow Sea. The longer voyage, taken by a part of the fleet, was by way of Cape of Good Hope.

It was the 10th of October before the Russian Armada finally set out from Reval to Libau, from which point it was to start on its voyage to the Far East. After some more delays it at last steamed away and reached Skagen, Denmark, where it dropped anchor for a short stop, on October 20. The next day at midnight the squadron under Admiral Rojestvensky, while passing through the North Sea, about 200 miles from the English coast, came within sight of some British steam fishing vessels, and mistaking the steam trawlers, as they afterwards alleged, for Japanese torpedo boats, the Russians opened fire upon them, and continued the bombardment for twenty minutes, during which time they sank the fisher *Crane*, badly injured the *Gull*, killed two men, and wounded a few others. After this incidental exploit, the squadron resumed its course southward. Sequel: The squadron was detained at Vigo, Spain, until England was satisfied reparation would be made for the blunder, an international commission was appointed to investigate the facts in the case of the firing on the fishermen, and this body having found the attack unjustifiable, the matter was settled by Russia paying Great Britain £65,000 (about $325,000).

Further progress of the fleets, until reaching eastern waters, was without particular incident. The voyage was protracted far beyond the time when the public expected the proximity of the two fleets would precipitate the great naval battle between the hostile sea powers. It was well on in April before the fleets under command of Admiral Rojestvensky in the China Sea, assumed an aggressive attitude. In watching the slow progress of the Russian Baltic fleet toward Chinese waters, students of the situation believed that Admiral Rojestvensky's object, even in threatening an attack, was not so much to seek battle with Admiral Togo, as to impress the rest of the world with a show of strength, and to so occupy the attention of the Japanese fleet, that in the negotiations for peace which were believed to be in progress the first of April, the powers of the world would combine to modify Japan's demands. On the other hand, it was thought that during the course of his long voyage from home waters, and particularly during his stay north of Madagascar, Admiral Rojestvensky had so improved the efficiency of his vessels and crews that he was only waiting a favorable opportunity to join in battle with Togo, confident of success. Another supposition was that he was getting ready to make a bold dash for Vladivostok, Russia's only remaining stronghold in the Far East, and fight his way through, if necessary.

The first of May, Rojestvensky was still maneuvering in the waters of the China Sea, but his reported departure from Kamranh Bay, a week previously, made his exact location and movements problematical. Admiral Togo was keeping his fleets far enough from trade routes to elude reporters. The placing of the Island of Formosa under martial law was not conclusive evidence of a contemplated attack from Formosan waters. Only when the great battle, now imminent, is fought, will the plans of the Admirals as well as the results be known. A. R. Read.

May, 1905.

RUSSO-TURKISH WAR. See Turkey, Vol. XXIII, pp. 692, 693.

RUSTAM. See Persia, Vol. XVIII, p. 570.

RUSTS, a common name given to various parasitic fungi, notably those of the order *Uredineæ*, which give a rusty appearance to the plants which they infest. Probably the best known is the wheat-rust, whose life-history is very complex. In different phases of its life-history it lives upon different hosts, or none at all. Normally appearing upon the leaves of the barberry, it produces spores, which germinate later in connection with wheat, producing the common red rust; while later, on the wheat (upon the stubble if the wheat is cut), there appear other spores, known as the black rust. The black rust spores give rise to still another phase of the plant, which does not live parasitically, and the spores of this, in turn, give rise to the form on the barberry. There are numerous forms of rusts infesting many plants, all with a more or less complex life-cycle.

RUTABAGA, the name given to a variety of turnip, otherwise known as the Swedish turnip, which diff s from the ordinary form in having longer and lowish roots. All the forms of turnip seem to have been derived from *Brassica campestris* of the Old World, a genus which also contains the mustards and cabbages.

RUTACÆ, a natural order of shrubs or trees, scattered over the temperate and warmer regions of the globe. Citrus is the most celebrated genus,

on account of its fruits (orange, lemon, lime, etc.). A volatile oil is obtained by distillation from the the flowers and epicarp, which, dissolved in alcohol, produce eau de cologne. W.R.B.

RUTEBŒUF. See FRANCE, Vol. IX, p. 568.

RUTHENIANS. See ROMAN CATHOLIC CHURCH. Vol. XX, p. 646.

RUTHENIUM. See CHEMISTRY, Vol. V, pp. 465, 466.

RUTGERS, HENRY, patriot and philanthropist; was born in New York city, on October 7, 1745, and was graduated from King's (now Columbia) College in 1766. He was an officer in the American army in the Revolution, served in the New York legislature for many years after 1784, and gave much real estate to the city for public purposes. He was a regent of the University of the State of New York from 1802 to 1826, and gave $5,000 to Queen's College, New Jersey, the name of which was changed to Rutgers. He died on February 17, 1830. W.F.J.

RUTGERS COLLEGE, an institution at New Brunswick, New Jersey, chartered in 1766 as Queen's

MAIN BUILDING, RUTGERS COLLEGE.

College, primarily for the education of candidates for the ministry of the Reformed Dutch Church, of which, by the charter, the president is required to be a communicant. The early history of the college was marked by constant struggles, and for a time its exercises were suspended, but in 1825, after receiving a benefaction from Henry Rutgers of New York, it was reopened under its present name. In 1863 a scientific department, under the name of Rutgers Scientific School, was organized. In 1901, there were 29 instructors, 222 students, and 43,000 volumes in the library.

RUTHERFORD, New Jersey, a borough of Bergen County, seven miles by steam and electric trolley lines north of Jersey City. It is a picturesque residential resort on the hills between the Hackensack and Passaic rivers, and has some factories. Population, 1900, 4,411. C.L.S.

RUTHERFORD COLLEGE, the seat of Rutherford College, in northwestern North Carolina. It is a co-educational, non-sectarian institution, organized in 1853, and having, in 1900, 9 instructors, 150 students, and a library containing 6,000 volumes.

RUTHERFORDTON, a village and the capital of Rutherford County, western North Carolina, 30 miles S.S.W. of Morgantown, on the Ohio River, and on the Charleston and the Seaboard Air Line railroads; has large factories of leather and harness, four churches and a courthouse. Population 1900, 880.

RUTHERFURD, LEWIS MORRIS, astronomer, was born at Morrisania, N. Y., on November 25, 1816, a great-nephew of Lord Stirling and a descendant of Lewis Morris. He was graduated from Williams College in 1834, studied law with William H. Seward, and was associated in practice with John Jay and Hamilton Fish. He left the bar, however, for astronomical studies, and particularly for astronomical photography. To this end he built in New York what was then the finest and most completely equipped private observatory in America, made an equatorial telescope, and invented a device for using it for photographic purposes. He invented also an apparatus for measuring the position, angle and distance from a central star of any star shown on a photographic plate, an object glass for photographing by means of chemical rather than visual rays, and a device for adapting an ordinary lens for photographic use. In his work he had at first little encouragement from other astronomers, but he was really the founder of that photographic astronomy which is now recognized to be of prime importance. In 1865 he placed some of the results of his labors in the hands of Professor Gould, who laid them before the National Academy of Sciences, and their value and significance were soon recognized by that body. To such labors Mr. Rutherfurd devoted most of his life. When his health failed he gave his instruments and collections of stellar photographs to Columbia College, of which he was a trustee. He died on May 30, 1892. W.F.J.

RUTILE. See TITANIUM, Vol. XXIII, p. 437.

RÜTIMEYER, LUDWIG, a Swiss naturalist; born at Biglen, Feb. 26, 1825; became an academic teacher at Berlin in 1854, and, in 1855, professor of zoölogy and comparative anatomy at Basel, where he died, Nov. 26, 1895. He wrote *Eocäne Säugetiere aus dem Gebiet des Schweizer Jura* (1862); *Ueber die Herkunft unserer Tierwelt* (1862); *Beiträge zur Natürlichen Geschichte der Wiederkäuer* (1865); *Die Grenzen der Tierwelt* (1868); *Ueber Thal- und Seebildung* (1869); *Ueber Pliocän und Eisperiode auf Beiden Seiten der Alpen* (1875); *Der Rigi* (1875); *Ueber die Art des Fortschritts in den Organischen Geschöpfen* (1876); *Studien zur Geschichte der Hirsch-Familie* (1882); *Die Bretagne* (1882); *Ueber einige Beziehungen Zwischen den Säugetieren Alter und Neuer Welt* (1888). G.A.S.

RUTLAND, a city of Vermont. The railroads entering the city are the Central Vermont, the Bennington and Rutland and the Delaware and Hudson. The city has a fine water-supply, gas and electric light plants, a number of fine churches, and public schools, a classical institute, military institute, several libraries, and convents, a United States

government building, one of the state penitentiaries, a house of correction, 5 national and 2 savings banks, and 2 trust companies. There are manufactories of dairy and cheese factory apparatus, machinery, sugar-evaporators, shirts, scales, sewer-pipe, engines and boilers, doors, sashes and blinds, monumental and cemetery work, and onyx decorative works. Population 1899, 11,760; 1900, 11,499. See also RUTLAND, Vol. XXI, p. 123.

RUTLAND (JOHN JAMES ROBERT MANNERS,) DUKE OF, (the seventh of the title), born at Belvoir Castle, Leicestershire, Dec. 13, 1818; educated at Eton, and Trinity College, Cambridge; was returned as a Conservative member of Parliament from Newark in 1841; was defeated in a contest for Liverpool in 1847, and for London in 1849, but was returned for Colchester in 1850, and represented that borough until 1857, when he was elected for North Leicestershire. While in Parliament he opposed the repeal of the Corn Laws; advocated cultivation of diplomatic relations with the Pope, a relaxation of the law of mortmain, the passing of the Ten Hours Factory Act; opposed Sir Robert Peel's free import measure in 1845–46, and from that time identified himself completely with the Conservatives; was First Commissioner of the Office of Works in all three of Lord Derby's cabinets; on the return of the Conservatives to power in 1874, was appointed Postmaster-General, holding the office until the Conservatives went out of power in 1880; was returned to Parliament for the Melton division of Leicestershire, 1885, when he resumed his former position in the conservative administration, and next year was appointed chancellor of the Duchy of Lancashire. He succeeded his brother in the peerage, March 2, 1888. *Revised by* R.C.A.

RUTLEDGE, EDWARD, an American public man; born in Charleston, S. C., Nov. 23, 1749. He received a liberal education; studied law at the Temple in London; and began practice in Charleston in 1773. He was a delegate from South Carolina to the Continental Congress, 1774–77; was appointed a member of the first board of war in June, 1776; later became captain of a company of volunteer infantry in the Revolutionary army; was taken prisoner when the British captured Charleston, and imprisoned at St. Augustine for a year; was later exchanged; and was governor of South Carolina from 1798 until Jan. 23, 1800, when he died at Charleston. E.E.T.

RUTLEDGE, JOHN, an American jurist; born in Charleston, S. C., in 1739. After studying law in London he began the practice of law in Charleston in 1761. He was a delegate to the Provincial Congress in 1765, and to the Continental Congress, 1774–77 and 1782–83; was president of South Carolina, 1776–78, and governor, 1779–82; State chancellor, 1784; member of the State Convention to ratify the Federal Constitution; received the Electoral vote of South Carolina for Vice-President in 1789; and was associate justice of the United States Supreme Court, 1789–91. He was elected chief justice of South Carolina in 1790, and resigned in 1795, in which year he was nominated for chief justice of the United States Supreme Court, but on account of his mental failing the Senate refused to confirm the nomination. He died in Charleston, S. C., July 23, 1800. E.E.T.

RUTULI. See ÆNEAS, Vol. I, p. 165; and also LATIUM, Vol. XIV, pp. 344, 345.

RUVO DI PUGLIA, Italy, a city in the province of Bari, Apulia, 20 miles west of Bari. It has an interesting 12th century cathedral, and is a trading center. Population, 18,000. C.L.S.

RYAN, ABRAM JOSEPH, clergyman and poet, best known as "Father Ryan," was born of Irish parentage at Norfolk, Va., on August 15, 1839, and was educated for the Roman Catholic priesthood. An ardent Confederate, he entered the Southern army in the Civil War as a chaplain, and also served as chaplain of a plague-stricken prison in New Orleans. After the war he was at Biloxi, Miss., at Knoxville, Tenn., at Augusta, Ga., where he edited *The Banner of the South*, and at Mobile, Ala., where he was some years pastor of a church. Finally he went to the Franciscan monastery of St. Boniface, at Louisville, Ky., and died there on April 22, 1886. He is chiefly remembered as the author of some stirring Southern war songs, and as perhaps the best poet the Confederate cause inspired. His best poem of that class is *The Conquered Banner*, written on Lee's surrender. W.F.J.

RYAN, PATRICK JOHN, an American prelate; born in Thurles, Ireland, Feb. 20, 1831. He graduated at Carlow College in 1852; was ordained sub-deacon in the Roman Catholic Church; and shortly after came to the United States. He became professor of English literature at Carondelet Theological Seminary, St. Louis; was ordained deacon there, and priest in 1853; and served at the cathedral, where he became rector in 1856. During the Civil war he acted as chaplain of the Gratiot Street Military Prison and Hospital, St. Louis; and while rector of Annunciation Church delivered Lenten lectures in English at Rome in 1868, on invitation of Pope Pius IX. In 1872 he was consecrated titular bishop of Tricomia in Palestine *in partibus infidelium*, and made coadjutor bishop of St. Louis; was promoted to archbishop in 1883, and transferred to the see of Philadelphia, June 8, 1884. He has written *What Catholics Do Not Believe; The Causes of Modern Religious Skepticism;* etc. E.E.T.

ARCHBISHOP RYAN.

RYDBERG, ABRAHAM VICTOR, a Swedish author; born in Jönköping, Smaland, Dec. 18, 1829; educated at Vexio and the University of Lund. He became literary editor of a daily paper at Gothenburg in 1855. In 1870 he was elected to the Swedish Parliament from Gothenburg; in 1876 inaugu-

rated the annual philosophical and historical conferences; in 1877 was elected to the Swedish Academy, and in 1882 was named professor of the history of civilization by the New Academy of Stockholm. Rydberg published a number of romances, which have been translated into English, as *The Freebooter of the Baltic; The Last Athenian; Adventures of Little Vigg; Roman Legends;* etc. He also published several extremely rationalistic works on religious and Bible subjects, as *Doctrine of the Bible on Christ; Jehovah Worship among the Hebrews; Pre-existence of Man,* and *Eschatology* (1880). His *Poems* were published (1882), his investigation in *German Mythology* (1886). Died Sept., 1895.

RYDQVIST, JOHAN ERIK (1800–78), a Swedish philologist. See SCANDINAVIAN LANGUAGES, Vol. XXI, p. 388.

RYE, the common name of species of *Secale*, a genus of grasses allied to wheat and barley. One species (*S. cereale*) is a well-known grain. It has, when in fruit, a roundish-quadrangular spike, with a tough rachis. Its cultivation does not extend so far north as that of barley, but it grows in regions too cold for wheat and on soils too poor and sandy for any other grain. Its ripening also can be more confidently reckoned upon in cold regions than that of any other grain. But rye succeeds best, and is most productive, in a climate where wheat ripens. It is extensively cultivated in the Middle Atlantic and Northeastern states, in Ohio and Michigan and other Western states. Rye grows best on a rich sandy loam, but it will flourish on light soils not adapted to other white crops. The soil should be prepared for rye in the same manner as for wheat. There is but one species of rye used as grain, but this is divided into two varieties, known as spring and winter rye. Winter rye is sown late in August or early in September, from one to two bushels of seed per acre being used, according to the quality of the soil. Except for harrowing and rolling in the spring, no after-cultivation is necessary.

RYE-GRASS. See AGRICULTURE, Vol. I, p. 333.

RYE HOUSE PLOT, in English history, an alleged conspiracy organized in 1683 at the Rye House, Hertfordshire, to assassinate Charles II and his brother, the Duke of York, in the interests of a Protestant succession. See also MONMOUTH, Vol. XVI, p. 783.

RYE IN THE UNITED STATES. See AGRICULTURE, in these Supplements. In 1900, the acreage in rye in all the States of the Union was 2,054,292 acres, with a total production of about 25,568,600 bushels, valued at $12,300,000. The average yield to the acre was 15.1 bushels, or in value about 51c to the bushel.

RYLE, JOHN CHARLES, an English bishop; born in Macclesfield, May 10, 1816; educated at Eton and Christ Church, Oxford, and ordained in the English Church in 1841, when he became curate of Exbury. In 1844 he was made rector of Helmingham, and in 1861 he became vicar of Stradbroke. He soon became widely known as the writer of pithy, forcible tracts of decided evangelical sentiment. In 1880 Lord Beaconsfield called him to be bishop of the newly created diocese of Liverpool. Ryle published *Expository Thoughts on the Gospels* (6 vols.); *Plain Speaking; Christian Leaders a Hundred Years Ago; Bishops and Clergy of Other Days* (1869); and *Church Reform Papers* (1870); and a large number of tracts, many of which have been reprinted in French, German, Dutch, Italian, Russian, Hindustani and Chinese. He died June 10, 1900.

RYOTWARI OR RYOTWARAY. See INDIA, Vol. XII, p. 810.

RYSWICK, PEACE OF. See FRANCE, Vol. IX, p. 511.

S

SAALE RIVER—SACHAU

SAALE RIVER. See ELBE, Vol. VII, p. 717.

SAARDAM. Same as ZAANDAM. See Vol. XXIV, p. 799.

SABA, a small island of the Lesser Antilles, in the West Indies. It is high and rocky; the inhabitants are of Scotch descent, but the island belongs to the Dutch. It is a dependency of Curaçao. Area, 5 sq. miles; population 1900, 2,189.

SABADELL, Spain, a manufacturing town in the province of Barcelona, 12 miles by rail north of Barcelona, on the Llobregat. Its industrial importance is of ancient date, it having long been noted for its production and export of paper, woolens, cottons, muslins, and other textiles. Population, 19,700. C.L.S.

SABADILLA OR CEBADILLA. See VERATRUM, Vol. XXIV, p. 177.

SABÆANS. See YEMEN, Vol. XXIV, pp. 775–778.

SABAKA OR SHABAK, a conqueror of EGYPT. See EGYPT, Vol. VII, p. 643.

SABANILLA, Colombia, a town and harbor of the department of Bolivar, on the Caribbean Sea, 10 miles by rail west of Barranquilla, at the mouth of the Magdalena, of which it is the seaport, with a large trade. Pop., 2,000. C.L.S.

SABATIER, PAUL, a French evangelist; born Aug. 3, 1858, at St. Michel de Chabrillanoux, Cevennes. After studying theology in Paris from 1880 to 1885, he preached at Strasburg until 1889, when, to escape compulsory German naturalization, he retired to St. Cierge-la-Serre, in the Cevennes, and carried on evangelization among the peasants. In addition to a number of sermons, he published a *Life of St. Francis of Assisi*, an English translation of which appeared in 1894.

SABBATHAI LEWI OR ZEBI. See JEWS, Vol. XIII, p. 691.

SABBATICAL YEAR. See SABBATH, Vol. XXI, p. 135.

SABELLIAN DIALECT. See ROMANCE LANGUAGES, Vol. XX, p. 678.

SABINE RIVER AND PASS. The river rises in Hunt County, Texas, and flows southeast to the western boundary of Louisiana, thence southward, forming the boundary between Texas and Louisiana, until it enters the Gulf of Mexico through SABINE PASS, which is the mouth of Sabine River. The pass has a muddy bar with shoal water and a narrow channel; dredging has been undertaken to improve it. There is a brick lighthouse on Brand Point with a flashing dioptric light of the third order. The Southern Pacific railroad passes here.

SABISM. See SABIANS, Vol. XXI, p. 136.

SABLE. See MARTEN, Vol. XV, p. 584.

SABLE, CAPE, the most southern point of the peninsula of Florida, lat. 25° 6′ N., long. 81° 9′ W. The site of Fort Poinsett.

SABLE, CAPE, Nova Scotia, the southernmost point of the province, on Cape Sable Island, to which it gives its name, derived from the French *sable*-sand. The island is administratively attached to Shelburne County and is occupied chiefly by fishermen. Population, 1901, 2,150. C.L.S.

SABLE ISLAND. See NOVA SCOTIA, Vol. XVII, p. 616.

SABRINA. See AZORES, Vol. III, p. 148.

SACALINE. See POLYGONUM, in these Supplements.

SACCHARINE. See CHEMISTRY, in these Supplements.

SACCHAROMETER. See BREWING, Vol. IV, p. 237.

SACCHAROMYCES. See FERMENTATION, Vol. IX, p. 84.

SAC CITY, a city and the capital of Sac County, central northwestern Iowa, 42 miles W. of Fort Dodge, on the Chicago and North-Western railroad, and on the north fork of the Raccoon River. It is in a dairying and stock-raising district, and has a flour-mill, foundries, a machine-shop and a lightning-rod factory. Population 1890, 1,249; 1900, 2,079.

SACCOMYIDÆ, a family of small rodents which resemble mice. Many species have long, kangaroo-like hind limbs and a long tail. They are remarkable for their large cheek-pouches, formed by an infolding of the skin of the head. This characteristic has given the popular name pocket-mice. The members of the genus *Dipodornys* are sometimes called kangaroo-rats (q.v., in these Supplements). The *Saccomyidæ* are inhabitants of western North America.

SACCOPHERYNGIDÆ, a family composed of several species of deep-sea fishes, which are believed to have affinities with the eels. Like many other deep-sea fishes, the body is very soft and delicate, and in consequence their anatomy is not well known. They have many peculiarities which are of interest to anatomists. These fishes have been classed in an order called *Lyomeri*, which name, signifying looseness, refers to the many anatomical features which are anomalous among fishes.

SACCULINA. See CRUSTACEA, Vol. VI, p. 572.

SACHAU, EDUARD, a German Orientalist; born at Neumünster, July 20, 1845. After having studied classical and Oriental languages, he became, in 1872, ordinary professor of Semitic languages at Vienna, and, in 1876, professor of Oriental languages at Berlin, and director, and, in 1898, president of the Oriental Seminary, member of the academy, and, in 1900, of the council for German Colonies. Among his works are *Reise in Syrien und Mesopotamien* (1883); *Altaramäische Innschrift auf der Statue des Königs Panammu von 'Sam-al* (1893); *Katalog der*

Persischen Handschriften der Bodleyana (1889); *Verzeichniss der Syrischen Handschriften; Am Euphrat und Tigris.* G.A.S.

SACHER-MASOCH, Leopold von, an Austrian author; born in Lemberg, Galicia, Jan. 27, 1835; studied at Prague and Gratz and was for a time teacher at the latter university, but soon gave himself up entirely to literature. With M. R. Armand he founded a review, which displayed sympathy for France, entitled *Auf der Höhe*, and in January, 1883, was made a chevalier of the Legion of Honor. Besides two historical works, *Der Aufstand in Gent unter König Karl V* (1857) and *Ungarns Untergang und Maria von Oesterreich* (1861), he published numerous novels, the best known of them being the series known as *Cain's Inheritance.* Died in Lindheim, Hesse, March 9, 1895.

SACHS, Bernhard, physician; was born in Baltimore, Maryland, in 1858, and studied at Harvard, Berlin, Vienna, and London, and was graduated in medicine from the University of Strasburg in 1882. He has since been settled in professional practice in New York city, paying especial attention to nervous and mental diseases. He is the author of *Mental and Nervous Diseases of Children*, and other works. W.F.J.

SACHS, Julius, a German plant-physiologist; born at Breslau, Oct. 2, 1832, studied at Prague; became, in 1861, professor at the Academy of Agriculture of Poppelsdorf; in 1867, professor of botany at Freiburg, and, in 1868, at Würzburg, where he died, May 29, 1897. His works treat on the condition of nourishment in plants, on the functional assimilation of chlorophyl, on the motion of assimilated matter in plant tissues, on the influence of heat and light upon the growth of plants. Among them are *Vorlesungen über Pflanzen-Physiologie* (1882); *Geschichte der Botanik vom 16th Jahrhundert bis 1860* (1875). His *Gesammelte Vorlesungen über Pflanzen-Physiologie* appeared at Leipsic in two volumes (1892–93). G.A.S.

SACHSE, Julius Friedrich, journalist and author; was born in Philadelphia, Penn., on November 22, 1842, and became a journalist in that city. He has written a number of historical works on the early colonists of Pennsylvania, especially the Germans, and the German Pietists, Sectarians, Dunkers, the Ephrata Cloister and others. W.F.J.

SAC INDIANS. See *Sacs*, under Indians, Vol. XII, p. 870.

SACKBUT. See Trombone, Vol. XXIII, p. 623.

SACKETT'S HARBOR, a village and port of entry in Jefferson County, New York, on the south shore of Black River Bay, 8 miles E. of Lake Ontario and 170 miles N.W. of Albany, having a navy-yard, barracks, mills, etc. It is the best harbor on the lake for ship-building. The *Oneida*, the first United States war vessel ever launched on Lake Ontario, was built at Sackett's Harbor in 1809. In the War of 1812 it was an important port, where the frigate *Superior*, of 66 guns, was built in 80 days, and the *Madison* in 45 days, from timber standing in the forest. Population 1890, 787; 1900, 1,266.

SACKVILLE, New Brunswick, a seaport town of Westmoreland County, at the head of Cumberland Basin in the Bay of Fundy, and a junction of the Intercolonial and the New Brunswick & Prince Edward Island railroads, 100 miles northeast of St. John. It is an educational center with some manufactures. Pop., 1900, 1,875. C.L.S.

SACKVILLE, Lord George, better known in history as Lord George Germain, soldier; was born in England on January 26, 1716, a son of the Duke of Dorset. He entered the British army, and seems to have been at times a brave but untrustworthy soldier. He distinguished himself and was wounded at Fontenoy, in 1745; but at Minden, in 1759, where he commanded the cavalry, he failed to charge when ordered, and was court-martialed and dismissed from the service. He was colonial secretary in 1775–82, and was one of the evil geniuses of the British Government, seconding Lord North in his most fatuous policies. He inherited some estates in 1770 which required him to take the surname of Germain, and in 1782 was created Viscount Sackville. He was at one time, though probably incorrectly, suspected of the authorship of the letters of Junius (see Junius, Vol. XIII, p. 785). He died on August 26, 1785. W.F.J.

SACKVILLE, Lionel Sackville West, Baron, an English diplomatist; born July 19, 1827, at Bourn Hall, Cambridgeshire. He was educated at home; was assistant précis writer to the Earl of Aberdeen, Secretary of State for Foreign Affairs in 1845; entered the diplomatic service in 1847; served as attaché to her Majesty's legations in Lisbon, Naples, Stuttgart and Berlin, till 1858; as secretary of legation in Turin, Madrid and Berlin; and secretary of embassy in Paris till 1872; was appointed envoy extraordinary and minister plenipotentiary to the Argentine Republic (1873); transferred to Madrid (1878); and to the United States (1881). He negotiated, in conjunction with Sir James Hudson, the commercial treaty with Sardinia (1863); represented her Majesty's government and that of Denmark at the conferences of Madrid on the affairs of Morocco (1880); was minister plenipotentiary at the conference in Washington on the affairs of Samoa (1887); and negotiated, in conjunction with Mr. Joseph Chamberlain and Sir Charles Tupper, the fisheries treaty of Washington (1888). He received his passports from the United States government in 1889, and was recalled to England, owing to an injudicious letter written to a Mr. Osgoodby, who had sent him a letter of enquiry in the false name of Murchison. In his reply he stated that the election of a Democratic President would be received with favor in England. In 1895 he made himself ridiculous by the publication of an attempt at self-exculpation and an account of a bogus plot against his life.

SACKVILLE, Thomas. See Dorset, Earl, Vol. VII, pp. 322, 323.

SACO, Maine, a city of York County, near the falls of the Saco River, 15 miles southwest of Portland on two divisions of the Boston and Maine railroad, and the junction for the branch

line to Ocean Park and Old Orchard Beach, favorite summer resorts, 4 miles west on the Atlantic. The town has good schools and some manufactures. See SACO, Vol. XXI, p. 140. Population, 1890, 6,075; 1900, 6,122. C.L.S.

SACO, JOSÉ ANTONIO, author and statesman; was born at Bayamo, Cuba, in May, 1797. He was for many years a Cuban deputy in the Spanish Cortes, but was also several times exiled for political causes. He gave much attention to the question of slavery, and wrote a number of works, among them a *History of Slavery from the Earliest Times* and a *Comparison between Cuba and the British Colonies*. He died in Spain in September, 1879. W.F.J.

SACO RIVER. See MAINE, Vol. XV, p. 302.

SACRAMENTO, the capital of the state of California. It is on the Southern Pacific railroad. The United States reports for 1900 show the following in regard to the mechanical and manufacturing industries of Sacramento: Number of establishments reporting, 279; aggregate capital, $7,492,313; average number of employees, 4,582; average total wages, $3,210,028; total value of products, $11,785,621. The Crocker Art Gallery and the California State Bank are among the finest recent buildings. Sacramento has 22 churches, of which 6 are Methodist Episcopal, 4 Baptist, 3 Congregational, 2 Presbyterian, 2 Lutheran, 1 Protestant Episcopal, 1 Roman Catholic, 1 Unitarian, 1 Christian and 1 Jewish. The city has 1 high-school, 6 primary and 3 grammar-schools, 1 ungraded school and 1 night school. The school census for 1900 reports 120 teachers and 7,500 pupils. It has, besides, 6 private schools, 1 free public library and 1 state library; the latter is in the capitol building, and contains 100,000 volumes. Sacramento has a Protestant Orphan Asylum, City Dispensary, the Southern Pacific Hospital, Marguerite Home for Old Women, Woman's Christian Temperance Union Mission, the Children's Day Home, city and county jail. Population 1890, 26,386; 1900, 29,282. See also SACRAMENTO, Vol. XXI, p. 140.

SACRAMENTO RIVER. See CALIFORNIA, Vol. IV, p. 617.

SACRED HEART, LADIES OF THE, a Roman Catholic order of nuns, founded in France in 1800, by Joseph Varin, a Jesuit priest, and Madalene Josephine Barat, who became first superior-general of the congregation. Pope Leo XII gave the order his approval in 1826. Its rules and system of education are based upon those of the Jesuits, and its mother-house is located in Paris. The congregation was introduced into the United States in 1818, the first settlement being made by Philippine Duchesne, at Florissant, Missouri. From this point they spread through all parts of the United States.

SACRED HEARTS OF JESUS AND MARY, a Roman Catholic brotherhood founded at Lyons, France, in 1821, by André Coindre. The order was established in the United States at Mobile, Alabama, in 1847. Since that time the community has spread rapidly, its work being very largely educational.

SACRUM. See ANATOMY, Vol. I, p. 720.

SADDLE. See HORSE, Vol. XII, p. 202; and also SADDLERY, Vol. XXI, p. 150.

SADOWA, BATTLE OF. See KÖNIGGRÄTZ, Vol. XIV, p. 139.

SAFED, one of the holy cities of the modern Jews in Palestine, situated on a hill, 2,700 feet above the Mediterranean, 6 miles N.W. of the Sea of Galilee and 13 miles N.W. of Tiberias. The town was destroyed by an earthquake in 1837, which killed about four thousand Jews. Again, in 1859, the town was damaged and many lives were lost. A castle of the Christians, built during the Crusades, was destroyed by the sultan of Damascus in 1220, and, having been rebuilt by the Templars, was again destroyed in 1266. Safed is the seat of a noted Jewish school. Population, Jews, 12,000; Moslems, 5,000; and Christians, 200.

SAFE-DEPOSIT COMPANIES, corporations for the safe keeping of valuable personal property, as money, bullion, stocks, bonds, jewelry, plate, etc. Such companies are in operation in many of the large cities of the United States. Among the earliest of such companies in the United States are the Safe-Deposit Company, chartered in New York in 1861, and the Fidelity Safe-Deposit Company, established by Nathaniel B. Browne at Philadelphia in 1867. These companies are now to be found in all large cities in the United States, and they are authorized to act as trustees of all kinds of property in most states of the Union. In the state of New York they are organized under a general law enacted in 1872. This law authorizes the formation of stock companies for the purpose of taking and receiving upon deposit as bailees, for safe-keeping and storage, all kinds of valuable goods and papers, and guaranteeing their safety on such terms as may be agreed upon between them and their patrons. It also authorizes them to construct and let out safes, vaults and other receptacles necessary for their business purposes. The affairs of these companies are managed by trustees elected annually by the stockholders, the latter being jointly and severally liable for all debts equal to the par value of their stock. These corporations are under the supervision of the bank superintendent. They have to make semi-annual reports to the latter, and are subjected to annual examinations by him. On Jan. 1, 1888, the combined capital of the safe-deposit companies in the state of New York amounted to three millions of dollars. In most of the other states of the Union such companies are created by special legislative enactments, but their business is carried on after the same general plan as the business of the New York companies.

In all of these establishments strong fire-proof vaults are built. These are constructed of steel and iron plates welded together and surrounded with masonry. Their interiors are fitted up with tiers of safes and deposit-boxes of sizes suitable for all requirements. The whole is under the surveillance of armed watchmen both day and night. Minute personal descriptions of their patrons are entered into books kept for the purpose of identifying them. Private passwords are also given to the patrons and entered upon the books. On renting a safe the

holder is furnished with the only key or keys that will fit its lock, no others being the same. Also see SAFES, Vol. XXI, p. 153.

SAFETY APPLIANCES FOR MINES. Where a level of a mine meets the perpendicular shaft it is customary to place what is known as a chair, or landing-dog, which may be thrown out to support a mine-cage when it is stopped opposite the level. It was formerly the custom, in order that the engineer of the hoisting-apparatus might know the position of the different chairs, to connect them with the engine-room by means of wires and bell-cranks, operating pointers on dials. This method was not wholly satisfactory, affording opportunity for a variety of accidents, and it has been superseded in many mines within recent years by an electrical-chair indicator of simple construction, that secures greatly increased safety. It also expedites the work, as engineers do not have to slow down to feel for the chairs. Any form of annunciator or semaphore may be employed with this electrical indicator, but a system of red and white disks is usually preferred. When a chair is in a normal position, leaving the shaft clear, the circuit is closed and a white disk is displayed before the engineer, but if a chair is thrown into the shaft the circuit is opened and a red disk flashes out, eclipsing the white disk in front of the engineer. The method is so simple that an error is hardly possible, and in case of any accident to the wires, breaking the circuit, or if they should be willfully cut, the red danger-signal is promptly brought before the engineer.

Workmen have sometimes been injured by allowing long tools to project from a car in going up or down a shaft. To prevent such accidents a safety tool-car has been introduced, which overcomes the difficulty in a simple manner. The sides and ends of the car are made to slope inwardly from the bottom, so as to turn all unprotected points and handles toward the center of the shaft. These safety tool-cars are also conveniently arranged with hand-holes for propelling and links for attachment to the cages.

A safety device for mine-cages, which insures absolute support for the cages should the hoisting-rope break, has been largely introduced. At the sides of the shaft are placed a series of stout projecting stops. Thrust-pieces from the sides of the cage are arranged to be pushed into these by the action of the hoisting-rope in breaking, should such accident occur. A stout spring is set in the top of the cage, being held up and back by the strain of the hoisting-rope. The instant this strain is removed, as by breaking of the rope, the spring acts and forces the thrust-pieces against the stops on the side of the shaft, stopping the descent of the cage.

C. H. COCHRANE.

SAFETY-LAMP. See COAL, Vol. VI, p. 68.

SAFETY-VALVE. See STEAM-ENGINE, Vol. XXII, p. 519.

SAFFI. See SAFI, in these Supplements.

SAFFORD, TRUMAN HENRY, an American astronomer and mathematician; born in Royalston, Vt., Jan. 6, 1836. He graduated from Harvard College in 1854. He studied astronomy for several years and in 1863 was made assistant observer at the Cambridge Observatory. In 1865 he was appointed a director at the Dearborn Observatory and professor of astronomy in the University of Chicago. In 1873 he was astronomer of the United States surveys in the West under Captain Wheeler. In 1876 he was appointed professor of astronomy at Williams College and in 1899 built a meridian observatory there. He published a star catalogue and a catalogue of right ascensions of close polar stars. He also predicted the position of the companion of Sirius. His books include *Mathematical Teaching and Its Modern Methods*. He is a fellow of the Royal Astronomical Society of England, American Academy of Arts and Sciences, and the American Association of Advanced Science. W.M.C.

SAFFRANINE, $C^{18}H^{14}N^4$ or $C^{18}H^{16}N^4O$, a red dye prepared by oxidizing a mixture of certain aniline bases and belonging to the group of phenazine dyes. A number of derivatives are known, and are used to dye silk and wool various shades of red or scarlet.

SAFI OR SAFFI, a seaport of Morocco, Africa, 120 miles W.N.W. of the city of Morocco. It is surrounded by walls, ditches and a ruined citadel, and is built at the bottom of a ravine. The place was held by the Portuguese for many years up to 1648, when they abandoned it. The shrine of the Seven Sleepers here is visited by both Moslems and Jews. Safi at one time had a large trade with Europe, but has declined much since the rise of Mogador. Population, 9,000.

SAGA. See EDDA, Vol. VII, pp. 563–565; and also, SNORRO STURLUSON, Vol. XXII, p. 212.

SAGAR OR SAUGOR, India, an island of the Sundarbans in the delta of the Ganges, at the Hugli outlet, 60 miles southwest of Calcutta. It is a holy bathing resort for Hindu pilgrims, who flock thither in great numbers. The island is low-lying, covered with swamps and jungle infested by tigers, and other animals. C.L.S.

SAGASTA, PRAXEDES MATEO, statesman; was born at Torrecilla, Spain, on July 21, 1827, and became a civil engineer. In 1854 he entered politics as a deputy in the Cortes from Zamora. He took part in the revolt of 1856 and had to flee to France, but returned, was professor of engineering at Madrid, founded *La Iberia*, a Liberal paper, and resumed his place in the Cortes. Again, in 1866, he was a revolutionist and had to flee, but in 1868 became minister of the interior in the provisional government. He was president of the Cortes in 1871, and in the next few years was minister of the interior, foreign minister and prime minister. In 1881–83 he was again prime minister, a third time in 1885–90, a fourth time in 1892–95, a fifth time in 1897–99, and for the sixth and last time in 1901. He was a man of great ability and of sterling integrity, who rendered invaluable services to his country. He saved it from anarchy after the death of Alfonso XII, and strove valiantly but in vain to settle the Cuban troubles without war with the United States. He

was a consistent Liberal, and commanded more confidence than almost any of his contemporaries. He died on January 5, 1903. W.F.J.

SAGE, HENRY WILLIAMS, an American capitalist and philanthropist; born in Middletown, Conn., Jan. 31, 1814. In 1827 he moved to Ithaca, N. Y., and in 1832 entered business there. He was largely interested in the lumber business in Canada and Michigan, and became one of the largest landholders in the latter State. From 1857 to 1880 he lived in Brooklyn, N. Y. He was actively interested in the founding of Cornell University, and in 1873 built a hall for women, known as Sage College. In 1874 he was elected president of the board of trustees, and gave numerous other large gifts to that institution amounting to over $1,000,000. He died in Ithaca, Sept. 18, 1897. E.E.T.

SAGE, RUSSELL, an American capitalist; born in Verona Township, Oneida County, N. Y., Aug. 4, 1816. He was brought up on a farm; attended school during winters; and began business life as errand-boy in his brother's grocery store in Troy, N. Y.; later becoming clerk and salesman in the same occupation. He was in business as a retail grocer, 1837–39, and as a wholesale grocer, 1837–57. He was an alderman in 1847, and, later, treasurer of Rensselaer County, and sat in the national House of Representatives, as a Whig, from 1853 to 1857. He became interested in railways and telegraphs, removed to New York in 1863, and engaged in money-lending and stock-exchange transactions. In 1891 he escaped assassination by a bomb, by interposing the person of a bystander between himself and the danger. E.E.T.

RUSSELL SAGE.

SAGE–BRUSH, the common name given to the numerous species of *Artemisia*, of the family *Compositæ*, natives of the plains and western mountains of North America. They are low shrubs or herbs, bitter-aromatic, with alternate leaves and small heads of yellowish or whitish flowers.

SAG HARBOR, New York, a village and port of entry on Long Island, in Suffolk County, 100 miles east of New York city. It is on an inlet of the southern shore of Gardiner's Bay, and is the terminus of a division of the Long Island railroad. The village was incorporated in 1803 and was originally an important whale-fishing port. It is a summer resort and has an active shipping trade, passenger and transit, during the season, with Connecticut and New York ports. Its industrial establishments include one of the largest watch-case factories in the world, silver works, and other manufactures. Sag Harbor is the seat of the Roman Catholic Convent of the Sacred Heart of St. Mary. Population, 1890, 2,640; 1900, 1,969. C.L.S.

SAGINAW, Michigan, the seat of Saginaw County, a city at the head of steamer navigation on the Saginaw River, 23 miles from its mouth in Saginaw Bay on Lake Huron, and 98 miles by rail northwest of Detroit on the Cincinnati, Saginaw & Mackinaw main line, and on five divisions of the Pere Marquette system. In 1890 Saginaw and East Saginaw on opposite banks of the river were consolidated as one city (see EAST SAGINAW, Vol. VII, p. 533, and SAGINAW, Vol. XXI, p. 156). The city has been largely rebuilt and has many fine public buildings, erected since a destructive fire in 1893 destroyed the best quarter. Its industrial and commercial importance is great; it is the center of a large beet-sugar producing region and has extensive manufacturing establishments. Population, 1890, 46,322; 1900, 42,345. C.L.S.

SAGINAW RIVER, Michigan, 32 miles long, is formed by the union of the Cass River from the east, the Flint and Shiawassee rivers from the south, and the Tittibawassee from the northwest. It flows northeast into Saginaw Bay, a deep indentation of Lake Huron, on the western shore, and is an important outlet for the lumber and other industries of the Michigan Peninsula. It is navigable by small steamers for 24 miles. SAGINAW BAY, 60 miles long and 30 miles wide, is much frequented for its valuable fisheries. C.L.S.

SAGUENAY RIVER. See QUEBEC, Vol. XX, p. 171.

SAHARA OR GREAT DESERT. See SAHARA, Vol. XXI, p. 157, and AFRICA, in these Supplements.

SAÏD PACHA. See EGYPT, Vol. VII, p. 665.

SAIL–FISH, the popular name of fishes of the genus *Histiophorus*, characterized by a large dorsal fin, which by its resemblance to a sail has suggested the name. The greatly modified ventral fins are composed of several long slender rays. The sail-fishes, also known as banner-fishes, are found in warm seas, especially the Indo-Pacific. They are very active fishes, like their near relatives, the sword-fishes.

SAINT AFFRIQUE, a town in the southern part of France in the department of Aveyron, 18 miles S. of Millau and 41 miles N. W. of Montpellier, on the South railroad. It manufactures cloths, serges and wines. Population 5,572.

ST. ALBANS, Vermont, the seat of Franklin County, since 1890 chartered as a city (see ST. ALBANS, Vol. XXI, p. 165). Besides its railway, canning, and celebrated dairy industries, it manufactures furniture, agricultural implements, and radiators. Population. 1890, 7,771; 1900, 6,239. C.L.S.

ST. ANDREW, ORDER OF. See ANDREW, in these Supplements.

ST. ANDREWS, a seaport town of New Brunswick, Canada, 60 miles S.W. of St. Johns. It is a summer and bathing resort, and has a tidal harbor 35 feet deep. Population, 2,500.

ST. AUGUSTINE, a town of Florida. The majority of the population are Roman Catholics, though the other religious denominations are well repre

sented. The Memorial Presbyterian Church is a famous structure. There are good schools and colleges, and there is an institution for the education of the deaf and blind. Cigar-making is the only manufacturing industry. Population, 1900, 4,272. See also St. Augustine, Vol. XXI, p. 167.

ST. BARTHOLOMEW'S DAY MASSACRE. See France, Vol. IX, p. 495.

ST. BERNARD DOGS. See Dogs, Vol. VII, pp. 283, 284.

ST. BERNARD, The Great, Switzerland, a mountain of the Pennine Alps in the canton of Valais on the Italian frontier. It rises to a height of 10,113 feet, and is famous for its pass from Aosta to Martigny between the Valais and the valley of St. Remy. At the highest point of the pass 7,860 feet above sea-level and 6 miles from St. Remy, near a little lake, is the hospice and convent founded in 962 by St. Bernard of Menton, on the site of a Roman temple dedicated to Jupiter, after whom the mountain was anciently called *Mons Jovis*. The hospice is maintained by voluntary subscriptions, and twelve monks of the Augustinian order live there all the year round, during the winter months daily patrolling the pass with their celebrated dogs to assist travelers, who are entertained gratuitously. Before the construction of the Alpine railway tunnels 20,000 persons were lodged at the hospice annually. The pass was the route for invading armies from Roman times. C.L.S.

ST. BERNARD, The Little, France, a mountain of the Graian Alps, in the department of Savoie near the Moutiers; height, 8,334 feet. A pass connects the valleys of the Isère and Dora and in a small valley at a height of 6,306 feet is the hospice of the Little St. Bernard, a branch of the Great St. Bernard (see above). C.L.S.

ST. BONIFACE, Canada, a town of Manitoba, opposite Winnipeg, on the Red River, and connected by several bridges. It is an important Roman Catholic center with a cathedral and diocesan establishment, and numerous good schools. It also has manufacturing interests and shares in the commerce and railway transportation facilities of its larger neighbor. Population, 1891, 1,553; 1901, 2,019. C.L.S.

ST. BRENDAN or BRANDAN. See Celtic Literature, Vol. V, pp. 264, 282, 283.

ST. CATHARINES, a city of Ontario, Canada. Population, 1901, 9,946. See St. Catharines, Vol. XXI, p. 168.

ST. CÉSAIRE, Canada, the seat of Rouville County, southern Quebec, on the Yamaska River and terminus of a branch line of the Central Vermont railroad, 30 miles east southeast of Montreal. The French Roman Catholic College of the Ste. Croix and other higher educational establishments are situated here. Population, 1901, 865. C.L.S.

ST. CHARLES, Illinois, a city and railroad junction in Kane County, on the Fox River, and on the Chicago, Great Western and the Chicago & Northwestern railroads, 38 miles west of Chicago. It is in a farming and dairying region exporting cattle and allied products, and manufacturing hardware, machinery, etc. Population, 1890, 1,690; 1900, 2,675. C.L.S.

ST. CHARLES, a city of Missouri. Population, 1900, 7,982. See St. Charles, Vol. XXI, p. 168.

ST. CLAIR, Michigan, a city and summer resort of St. Clair County on the St. Clair River, midway between Lake Huron and Lake St. Clair, and 12 miles by rail south of Port Huron, on the Detroit & Port Huron Shore Line. It is opposite Courtright, a town and railway junction of Lambton County, Ontario, Canada, with which it communicates by ferry. It has shipbuilding yards, milling and other industries. Population, 1890, 2,353; 1900, 2,543. C.L.S.

ST. CLAIR, Pennsylvania, a coal-mining borough of Schuylkill County, on divisions of the Pennsylvania and the Reynoldsville & Falls Creek railroads, 3 miles north of Pottsville. See St. Clair, Vol. XXI, p. 168. Population, 1890, 3,680; 1900, 4,638. C.L.S.

ST. CLAIR, lake and river. See St. Lawrence, Vol. XXI, p. 188.

SAINT CLAIR, Arthur, an American soldier; born in Thurso, Scotland, in 1734. In 1757 he became an ensign in the 60th Foot, and came to America in 1758; served under Amherst at Louisburg; was made a lieutenant in 1759; and distinguished himself at Quebec under Wolfe. He resigned his commission in 1762, and in 1764 settled in the Ligonier valley, Pa. He became colonel of militia in 1775; colonel of the 2d Pennsylvania regiment, Jan. 3, 1776; joined Sullivan in Canada and was in the disaster at Three Rivers; became brigadier-general, Aug. 9, 1776, and major-general, Feb. 19, 1777. In November, 1776, he joined Washington, and was appointed to organize the New Jersey militia. He was engaged in the battle of Princeton, and later became adjutant-general of the army. He was driven from Fort Ticonderoga in 1777, but was honorably acquitted of charges. He sat on the court martial that condemned André, and participated in the surrender of Cornwallis at Yorktown. In 1791, being general-in-chief of the army, he suffered a severe defeat by Indians of the Wabash, and in 1792 he resigned his commission. He died in poverty in Greensburg, Pa., Aug. 13, 1818. E.E.T.

ST. CLAIRSVILLE, a village and the capital of Belmont County, eastern Ohio, 10 miles W. of Wheeling, West Virginia, on the St. Clairsville division of the Baltimore and Ohio railroad and on the St. Clairsville and Northern railroad. Coal and limestone occur abundantly in this district. Population 1890, 1,191; 1900, 1,210.

ST. CLOUD, Minnesota, the seat of Stearns County, a city on the Mississippi River, and an important junction of four divisions of the Great Northern railroad, and one of the Northern Pacific system, 65 miles northwest of Minneapolis. Among its institutions are a state normal school, state reformatory, and St. Raphael's Roman Catholic Hospital. Granite quarrying, lumber-

ing, and several factories utilize the water power supplied by the river. Population, 1890, 7,686; 1900, 8,663. C.L.S.

ST. CROIX RIVER. See NEW BRUNSWICK, Vol. XVII, p. 382.

ST. CROIX RIVER, Wisconsin, a tributary of the Mississippi, flowing from Upper St. Croix Lake in Douglas County, on the south side of the ridge overlooking Lake Superior. Fed also by numerous small streams from the same ridge, it has a winding west by south and southeastern course of 150 miles, a little above its junction with the Mississippi at Prescott, expanding into the Lower St. Croix Lake. It is navigable for over 50 miles. C.L.S.

SAINT CUTHBERT'S BEADS. See *Crinoidea*, under ECHINODERMATA, Vol. VII, p. 552.

ST. DENIS REUNION. See REUNION, Vol. XX, pp. 505–507.

ST. DIZIER, France, a town in the department of Haute-Marne, on the Marne River, 13 miles by rail S.W. of Barle-Duc. It is a metal-manufacturing, and historic center. Population, 10,000. C.L.S.

STE. ANNE DE BEAUPRÉ, Canada, a village and pilgrimage resort of Montmorency County, Quebec, on the north bank of the St. Lawrence River, at the confluence of the Ste. Anne River, 20 miles by rail northeast of Quebec city. The ancient seventeenth century church, and a handsome modern basilica, containing relics of Ste. Anne, and valuable paintings, are notable buildings. Ste. Anne's Falls, and other scenic attractions also make Ste. Anne a frequented summer resort. Population, 1901, 360. C.L.S.

STE. GENEVIÈVE, Missouri, the seat of Ste. Genevieve County, a city on the Mississippi River, and terminus of the Chester, Perryville and Ste. Genevieve railroad, 60 miles southeast of St. Louis. It shares in the steamer transit facilities of the river and has flouring mills, foundries, and manufactures of agricultural implements, bricks, lime, etc. Population, 1900, 1,707. C.L.S.

ST. ELIAS, a mountain in the northwest of North America on the boundary line between the United States and Canada, in lat. 60° 17′ 34.4″ N., and long. 140° 55′ 19.6″ W. Its height as determined by the United States Coast and Geodetic Survey is 18,100 feet. It is not volcanic, nor is it, as was long reputed, the highest peak in North America, being surpassed by Mt. McKinley in Alaska, Mt. Orizaba in Mexico, and Mt. Logan in Canada, 26 miles N.E. of St. Elias. It was ascended on July 30, 1897, by Prince Louis Amadeus, of Savoy, and party.

ST. FRANCIS RIVER, Quebec, a southern affluent of the St. Lawrence River, flowing south from Lake St. Francis, in Beauce County to Lennox in Sherbrooke County, where it turns and follows a northwesterly course to its junction with the St. Lawrence at Pierreville Mills on Lake St. Peter. It is 120 miles long, is unnavigable, owing to its rapids, but yields abundant power for mills along its course. C.L.S.

ST. FRANCIS RIVER, rises in Saint François County, Missouri, and flowing south forms the boundary between Butler and Stoddard counties, entering Arkansas just above St. Francis city in Clay County. Below St. Francis it forms the wide expansions of Sunk Lands and other large bayous or lagoons extending some distance southward. It receives the waters of Big Lake and Little River from the east and finally enters the Mississippi a little distance above Helena in Phillips County In flood time the river is navigable for nearly 200 miles. C.L.S.

ST. FRANCIS XAVIER, THE COLLEGE OF. This college is located in New York city, and conducted by the fathers of the Society of Jesus, and intended for day scholars only; was founded in October, 1847, and in January, 1861, was endowed by the regents of the University of the State of New York with full collegiate powers and privileges. The course of studies comprises two distinct departments: the graduate school and the college proper. The college course is a liberal training in languages, science, history, ethics, Christian doctrine and oratory. There were in 1904, 30 instructors and 750 students. W.R.B.

ST. GALL MONASTERY. See ABBEY, Vol. I, pp. 18, 19.

SAINT GAUDENS, AUGUSTUS, an American sculptor; born in Dublin, Ireland, March 1, 1848. He came to the United States in infancy; learned the trade of cameo-cutter; studied drawing at Cooper Institute in 1861; was a student at the National Academy of Design, 1865–66; and at the École des Beaux Arts, Paris, 1867–70. He lived in Rome, 1870–72, producing there his first figure, *Hiawatha*, in 1871; and settled in New York in 1872. Among his works are: *The Adoration of the Cross* (in St. Thomas's Church, New York); *The Puritan; Diana* (on the tower of Madison Square Garden, New York); statues of Abraham Lincoln and of John Logan, Chicago; of Admiral Farragut and Peter Cooper, New York; of Col. R. G. Shaw, Boston; the monument to Gen. Sherman, New York; and numerous other statues, busts, etc. He is a corresponding member of the Institute of France; and an officer of the Legion of Honor. He received a medal of honor in Paris, 1900, and a special medal of honor at Buffalo, 1901.

AUG. ST. GAUDENS.

E.E.T.

SAINT GAUDENS, LOUIS, an American sculptor; born in New York, Jan. 8, 1854. He studied at the École des Beaux Arts, 1879–80, assisted his brother Augustus (see above) in numerous works, and has produced a *Faun*, etc.

E.E.T.

SAINT GEORGE, a town, the capital of Washington County, southwestern Utah, on the Virgin River, about 280 miles S.W. of Salt Lake City; is the chief trade-center in the rich valley of the

Virgin River. Its principal industries are a tannery and a broom factory. Pop., 1900, 1,600.

ST. GEORGE'S. See BERMUDA ISLANDS, Vol. III, p. 518.

ST. GEORGE'S. See GRENADA, Vol. XI, p. 164.

ST. GEORGE'S CHANNEL, the passage on the western coast of Great Britain from 50 to 95 miles wide, separating Ireland. It connects the Irish Sea with the Atlantic and extends N. to S. 100 miles along the coast of Wales from Anglesey and Holyhead to St. David's Head, and along the Irish coast from Dublin to Wexford. C.L.S.

ST. GOTTHARD TUNNEL. See TUNNELING, Vol. XXIII, p. 664.

SAINT HELENA, California, a town in Napa County, situated in a valley between two ridges of the Coast Range, on the South Vallejo and Calistoga division of the Southern Pacific railroad, 60 miles northeast of San Francisco. It is a pleasant summer and winter resort in a vine and olive-growing region producing wine and oil, and having some mining and manufacturing industries. Population, 1900, 1,582. C.L.S.

ST. HELIER. See JERSEY, Vol. XIII, p. 646.

ST. HYACINTHE, a city and the capital of St. Hyacinthe County, south-central Quebec, Canada, on the left bank of the navigable Yamaska River, and on the Grand Trunk railroad, 32 miles E.N.E. of Montreal. Is in the center of a rich agricultural and lumber district; has lumber-mills and manufactories of woolen goods, leather, woodenware, iron castings; has many fine buildings, including the bishop's palace and the main building of a Catholic college. Population, 1891, 7,016; 1901, 9,210.

ST. IGNACE, a city and the capital of Mackinac County, southeastern part of the upper peninsula of Michigan, on the Straits of Mackinac, and on the Duluth, South Shore and Atlantic railroad, of which it is the terminus; opposite Mackinaw City, and 45 miles N. of Petoskey. Has a fine harbor, making it a terminal port for several lines of steamers and a port of call for others. Principal industries are iron-mining, manufacturing, shipping of lumber and fish. In its early days St. Ignace was the seat of a Jesuit mission, and contains a church built by Jacques Marquette, the oldest in northern Michigan. Population, 1890, 2,704; 1900, 2,271.

ST. JEROME, Canada, the seat of Terrebonne County, a town in southwestern Quebec, north of the St. Lawrence River, on the Rivière du Nord and at a junction of divisions of the Great Northern and the Canadian Pacific railroads, 28 miles northwest of Montreal. Lumber, flour, and woolen mills are supplied with abundant power from the river which has a rapid descent of 300 feet in four miles above the town. Population, 1891, 2,868; 1901, 3,619. C.L.S.

SAINT JOHN, JOHN PIERCE, an American public man; born in Brookville, Ind., Feb. 25, 1833. He received a frontier education, and joined the Union army from Illinois, serving as captain and lieutenant-colonel. He settled in Kansas; was elected to the Kansas Senate in 1872; and was governor of the state, 1879–83. In 1884 he was nominated for President on the ticket of the Prohibitionist party but was defeated, and has since then actively supported the free coinage of silver and woman suffrage, opposed the war against the Filipinos, and supported the doctrines of William J. Bryan. E.E.T.

ST. JOHN, PERCY BOLINGBROKE, traveler and author, son of James Augustus St. John (q. v., Vol. XXI, p. 182); was born at Plymouth, England, on March 4, 1821. He became a traveling companion of his father in the East, and also visited North America, spending some time in the United States, Texas and Mexico, and serving in the Texan army during the brief existence of that republic. He settled in Paris in 1847 as an English newspaper correspondent and man of letters, and wrote many volumes and innumerable articles for magazines and reviews. Among his books were a *Young Naturalist's Book of Birds* (1844); *Three Days of the French Revolution* (1848); *The Book of the War* (1853); *Arctic Crusoe* (1854); *The Snow Ship* (1865); *As Good as Gold* (1875), and *A Daughter of the Sea* (1884). He died on March 15, 1889. W.F.J.

ST. JOHN LAKE, Canada, in Chicoutimi County, northern Quebec, is 28 miles long with a maximum width of 25 miles and an area of 360 square miles; its chief feeders are the Peribonka, Mistassini, Chamouchouan, and the Metabetchouan; its outlet is the Saguenay River (see QUEBEC, Vol. XX, p. 165). From Quebec, 125 miles to the south, the Quebec and Lake St. John railroad reaches Roberval and other villages and angling resorts on its shores. C.L.S.

ST. JOHN RIVER. See NEW BRUNSWICK, Vol. XVII, p. 382.

ST. JOHNS. See ANTIGUA, Vol. II, p. 113.

ST. JOHNS, a town and the capital of St. Johns County, southern Quebec, Canada, 23 miles S.E. of Montreal, on the Richelieu River, and at the junction of the Vermont Central, the Grand Trunk and the Canadian Pacific railroads. Besides the manufacture of earthenware goods, which is the leading industry, it has foundries, tanneries, saw, grist and planing mills, etc., and carries on a large trade in lumber, grain and farm produce. Population, 1891, 4,722; 1901, 4,030.

SAINT JOHN'S, Michigan, the seat of Clinton County, a village of Bingham township on a division of the Detroit, Grand Haven & Milwaukee railroad, 60 miles east of Grand Rapids. It is the market center of an extensive farming and fruit-growing region; and its manufacturing industries include a notable output of tables, while gasoline engines and farming implements also are manufactured. Population, 1900, 3,388. C.L.S.

ST. JOHNSBURY, Vermont, the seat of Caledonia County, a town and village on the Passumpsic River, 8 miles above its confluence with the Connecticut River, and 37 miles northeast of Montpelier on divisions of the Boston & Maine, and the St. Johnsbury & Lake Champlain railroads. Its healthful climate and diversified scenic attractions make it a favorite summer resort.

It has long been noted as the seat of the Fairbank's scale industries and of the educational institutions founded by the firm. (See ST. JOHNSBURY, Vol, XXI, p. 185.) Hardware, lumber, furniture, crackers and minor articles also are manufactured. Population, 1900, of town, 7,010, including village, 5,666. C.L.S.

ST. JOHN'S COLLEGE, founded at Annapolis, Maryland, in 1789, being a development of King William's School, which was established in 1696. The college is non-sectarian, and in addition to the usual courses in languages and science, there are departments in mental and moral science, political economy, history, law, mechanical engineering, military science and tactics. The total income (1904) amounts to $45,000. There are 13 instructors and 200 students. W.R.B.

ST. JOHN'S RIVER, a stream rising in Brevard County, eastern Florida, and for a course of nearly 350 miles flows in a northerly direction through the same state, emptying into the Atlantic Ocean in Duval County, about 15 miles N.E. of Jacksonville. Steamboats of large size navigate the river as far as Enterprise. For two-thirds of its course it is nowhere less than a mile in width, and for 100 miles from its mouth resembles a lagoon more than a river. It is fed by springs and the overflow of swamps, and passes through a level region abounding in orange groves.

ST. JOHN'S UNIVERSITY, a Roman Catholic institution of learning located at Collegeville, Minnesota. Founded in 1857 by the Very Reverend Demetrius Maronga, its first president. It was empowered to confer university degrees in 1869, and in 1878 received Pontifical authority to confer the doctor's degree in theology, philosophy and canon law. The cost of tuition is $50 per annum, and living expenses $150. Extra fees, $25. Total income (1904), $28,000. There are 30 instructors and 300 students. W.R.B.

ST. JOHNSVILLE, New York, a town and village of Montgomery County, in the Mohawk Valley on the Erie canal, and on divisions of the West Shore and the New York Central & Hudson River railroads, 64 miles northwest of Albany. It has agricultural industries, knitting mills, and piano factories. Population, 1900, of town, 2,674, including village, 1,873. C.L.S.

ST. JOHNSWORT FAMILY, the common name given to the family *Hypericaceæ*, distinguished by its opposite and entire leaves, which bear transparent and sometimes blackish dots, its numerous stamens often in clusters, and a many-seeded pod. The largest genus is *Hypericum*, represented in our flora by numerous species.

SAINT JOSEPH, a post village of Berrien County, southwestern Michigan, at the mouth of the Saint Joseph, on Lake Michigan, and on the Chicago and West Michigan and the Vandalia Line railroads, 22 miles N. of Niles and 60 miles by water N.E. of Chicago. It is engaged in the production of lumber, machinery and flour, and in shipping fruit. Population 1900, 5,155.

ST. JOSEPH, a city and the capital of Buchanan County, northwestern Missouri. (For article giving its history until 1880, see ST. JOSEPH, Vol. XXI, p. 185.) In 1900 it had 440 manufacturing establishments, employing 7,991 persons. The leading industries include manufactories of men's clothing, and slaughtering and meat-packing (wholesale), the value of the latter yield, in 1900, being over $19,000,000. Among the notable buildings erected since 1880 are the United States government building, the union depot and free public library building. In addition to being a manufacturing city of note, St. Joseph is also an important shipping-center of cattle and hogs and grain, including corn, oats and wheat. The period from 1880 to 1890 was marked by a large increase in population, the number of inhabitants of the city increasing from 32,431 in the former year to 52,324 in the latter. The corporate limits in 1895 included seven square miles, and extended two and a half miles back from the river. Pop. 1900, 102,979.

ST. LAWRENCE CANAL. See CANAL, in these Supplements.

ST. LAWRENCE UNIVERSITY, an educational institution located at Canton, New York. It was founded in 1856 by the Universalists, and formerly comprised three departments—the academy, the college, and the theological seminary. The academy has been dropped, and the other two, while under the same board of trustees, are entirely independent of each other, both in educational and financial affairs. Besides a campus of 27 acres with buildings and equipments, the college has an endowment fund of about $190,000, and the seminary about $166,000. Both departments are open to women, and in 1901 had 150 students, 9 instructors in the college and 7 in the seminary, 13,000 volumes in the library, and a total income of $22,200.

ST. LOUIS, Michigan, a city of Gratiot County, prior to 1890 a village, on the Pine River, and on the Saginaw and Elmdale division of the Pere Marquette railroad, 8 miles north of the county seat Ithaca, and 34 miles west of Saginaw. It is the seat of Yerington's College and has medicinal mineral springs which have given it a reputation as a health resort. The manufacturing industries are those of a farming region and include lumber mills, foundry and machine shops, salt works and chemical works. Population, 1890, 1,322; 1900, 1,403. C.L.S.

ST. LOUIS, a city of eastern Missouri. (For general article, see ST. LOUIS, Vol. XXI, pp. 192–195.) In 1890 there were in St. Louis 336.58 miles of improved streets, 76.44 miles of paved alleys, 311.09 miles of public and district sewers. The sewer system is most extensive, surface-drainage being unknown in the city. The largest sewer, known as the Mill Creek, following the line of a natural drain, is 20 feet wide and 15 feet high. Local transit is carried on by cable and electric lines, which operate 250 miles of track, and electricity and gas furnish the means of lighting the city. The public parks in 1890 covered an area of 3,200 acres, and among the buildings of note erected since 1880 may be mentioned the new

City Hall, cost $2,000,000, and the Union Railway station, one of the finest railroad depots in the world, having a train-shed covering 30 tracks, and costing, with the ground, $6,500,000. The churches of the city include representatives of the leading denominations and number about 230, some of the more important ones being the Roman Catholic Cathedral, Christ Church (Protestant Episcopal), Grand Avenue Presbyterian Church, Church of the Messiah (Unitarian), First Presbyterian and the Pilgrim Congregational churches. The school census of 1901–02 showed over 75,000 pupils enrolled, and buildings valued at $3,500,000; $91,214 was spent (1902) on the public library. Besides the public schools the city has numerous private and parochial schools

UNION DEPOT, ST. LOUIS.

of primary and grammar grade, besides being the seat of a large number of institutions for higher education and professional training, among them Washington University (q.v., in these Supplements), St. Louis University (Roman Catholic), Christian Brothers' College (Roman Catholic), Concordia Theological Seminary (Lutheran), Beaumont Hospital Medical College, St. Louis College of Pharmacy, St. Louis Training School for Nurses, St. Louis Law School, St. Louis School of Fine Arts, and several institutions for deaf-mutes and the blind. In 1901 there were 35 libraries of 1,000 volumes and over, having a total of 394,636 bound volumes, of which the Free Public Library contained 90,000 volumes, the Mercantile, 88,300; the St. Louis University, 30,000; the St. Louis Law School, 18,138; and the St. Louis Academy of Science, 16,000. There were in 1899, 12 daily and 61 weekly papers, besides a large number of fortnightly, monthly, bimonthly and quarterly periodicals.

The census returns for 1900 show that the city had in that year 6,732 manufacturing establishments, with a combined capital of $162,179,331, paying $49,185,696 to 92,450 persons, and $115,458,275 for materials from which were turned out products valued at $233,629,733. The leading industries were: Tobacco, chewing, smoking, and snuff; capital, $6,757,781, products, $24,411,307; slaughtering and meat packing, $2,512,805, products, $12,267,532; foundry and machine shops, $9,582,677, products, $11,628,140; men's clothing, $4,426,968, products, $8,755,697; women's clothing, $990,456, products, $2,987,446; coffee and spice, $2,271,298, products. $4,765,564; carriages and wagons, $2,466,202, products, $4,033,799; steam railroad cars, $2,880,982, products, $4,974,662; street railroad cars, $2,740,655, products, $2,406,836; chemicals, $1,969,875, products, $1,804,090; confectionery, $1,248,547, products, $2,997,685; publishing houses, $7,053,523, products, $9,816,455; flouring and grist-mills, $1,386,107, products, $4,004,062; furniture, $2,759,567, products, $3,268,765. The civic receipts for 1902 amounted to $9,261,218, and the expenditures to $8,470,478. These sums include the water works revenue and expenditure. The total bonded debt of the city is $18,916,278. Its assessed valuation of real estate property in 1902 amounted to $329,659,090, while the value of personal property was $60,294,640. The tax levy for the year was $1.30 on the $100 valuation. Owing to its transportation facilities by rail and water, St. Louis is an important shipping center. The receipts of freight amounted in 1899 to 15,133,448 tons, and the shipments to 8,350,128 tons.

St. Louis is an interior port which may be entered by foreign goods without appraisement at the original port of reception, and had imports for the fiscal year ending June 30, 1893, valued at $3,305,351. St. Louis has five bridges, three across the Missouri River and two across the Mississippi River, these latter being the Illinois and St. Louis or Eads bridge, and the Merchants' bridge, completed Dec. 31, 1889, at a cost of $3,000,000. On the afternoon of May 27, 1896, one of the fiercest cyclones ever known in the West brought disaster upon the city of St. Louis. The storm swept through the heart of the city, wrecking many buildings; crossed the river, demolishing warehouse property and shipping and wrecking the upper works of the Eads bridge, and passed over East St. Louis, doing a vast amount of damage. The fatalities for the two cities were estimated at 388; the injured in St. Louis about 1,000, and a property loss for the latter city of from $22,000,000 to $50,000,000. Population 1880, 350,522; 1890, according to United States census, 451,770; according to the 12th census (1900), 575,238.

ST. LOUIS, a river. See ST. LAWRENCE, Vol. XXI, pp. 186, 187.

ST. LOUIS UNIVERSITY, an educational institution for men at St. Louis, Missouri; established

ST. LOUIS UNIVERSITY BUILDING.

in 1829, and maintained by the Roman Catholic Church. In 1901 there were 435 students in

attendance, 34 instructors, and a library of 41,000 volumes. The larger portion of the student body is enrolled in the preparatory department. Inclusive of the year 1901, the graduates from the foundation of the institution numbered 1,121.

ST. MARGUERITE ISLANDS. See LERINS, in these Supplements.

ST. MARTINSVILLE, Louisiana, the administrative seat of St. Martin Parish, a village on the Bayou Teche at the head of steamboat navigation from the Gulf of Mexico, and on a division of the Southern Pacific Company railroad, 178 miles west of New Orleans. It is an agricultural and manufacturing center exporting cotton, sugar-cane, corn, rice and other products. Population, 1890, 1,814; 1900, 1,926. C.L.S.

ST. MARY'S, Ohio, a township and village of Auglaize County on the St. Mary's River, the Miami and Erie canal, two divisions of the Lake Erie & Western system, and the main line of the Columbus & Northwestern railroad, 105 miles west-northwest of Columbus. Near the village is the Grand Reservoir with a superficial area of 17,000 acres, and the main feeder of the Wabash River. The industries are connected with the natural gas and oil wells, and the agriculture of the neighborhood, and there are manufactures of machinery, woolens, strawboard, linseed oil, etc. Population, 1900, of village, 5,359. C.L.S.

ST. MARYS, a village and port of entry, the capital of Camden County, southeastern Georgia, about 32 miles S. of Brunswick, on the St. Marys River, at its confluence with Cumberland Sound. It has a fine harbor, admitting large vessels. The principal industry is in the sawing of lumber. Population 1890, 575; 1900, 529.

ST. MARYS, a village of Pottawatomie County, northeastern Kansas, near the Kansas River, on the Union Pacific railroad. It has flour and lumber mills, and is the seat of St. Marys College, a Roman Catholic institution of learning for the education of young men. In the reports for 1901 it had 30 instructors, 330 students, a library of 10,500 volumes and a yearly income of $30,000. Population 1890, 1,174; 1900, 1,390.

ST. MARYS, a village of Marion County, north central Kentucky, about 5 miles W. of Lebanon and 50 miles S.S.E. of Louisville, on the Lebanon branch of the Louisville and Nashville railroad. It is in a county whose surface is hilly and in parts heavily wooded, abounding in limestone, and producing corn, oats, wheat and cattle. The village is the seat of St. Mary's College, a Roman Catholic institution for the education of young men, which in 1901 had 10 instructors, 110 students, and a library of 4,000 volumes. Population St. Mary district, 1900, 1,300.

ST. MARYS, Ontario, a town and railway junction of Perth County, in the southwest of the province, on the Thames River, and on two divisions of the Grand Trunk railroad, 22 miles north of London, and 70 miles southeast of Goderich on Lake Huron. The river furnishes abundant power for oatmeal, flour, flax and woolen mills, and valuable limestone is quarried in the neighborhood and exported. Population, 1891, 3,416; 1901, 3,384. C.L.S.

ST. MARYS RIVER. See ST. LAWRENCE, Vol. XXI, p. 187; and CANALS, in these Supplements.

ST. MAURICE RIVER. See QUEBEC, Vol. XX, p. 171.

ST. MICHAEL, a post village of Talbot County, eastern Maryland, 22 miles by water S.E. of Annapolis, on a navigable inlet of Chesapeake Bay, and on the Baltimore, Chesapeake and Atlantic railroad. It has a brickyard, sawmill, ship-building industries, and many vessels engaged in the fish and oyster trade. Population 1890, 1,329; 1900, 1,043.

ST. MICHAELS, a station on an island of the same name, in Norton Sound, off the west coast of Alaska, about 60 miles N. of the Aphoon mouth of the Yukon river. It is the principal commercial headquarters for the Yukon and Arctic regions.

ST. MICHAELS. See AZORES, Vol. III, p. 148.

ST. PARIS, a post village in Champaign County, western central Ohio, 11 miles W. of Urbana, and about 50 miles W.N.W. of Columbus, on the Ohio Southern and the Pittsburg, Cincinnati, Chicago and St. Louis railroads. It is situated in an agricultural region, and has a distillery, carriage shops and planing-mills. Population 1900, 1,222.

ST. PAUL, a city, the capital of the state of Minnesota and of the County of Ramsey. (For general article, see ST. PAUL, Vol. XXI, pp. 197, 198.) Built originally upon a series of steep terraces, St. Paul was in earlier years confined by its topography almost entirely to the first and second benches, or terraces, ascending from the river. By 1888, however, the city had spread over the wide and commodious plateaus lying east, west and north of the surrounding bluffs, and now embraces 35,482 acres. Its business center is still confined chiefly to the lower terraces, while the high plateaus that rise above them on every side are the favorite residence districts of the city. In the older portions of the city the streets are too narrow for comfort or beauty, but in the newer the thoroughfares are ample in width and laid out according to modern ideas of usefulness and sightliness. On the western bluff, known as St. Anthony's Hill, are many streets paved with asphaltum and boulevarded, which are singularly handsome and attractive, and chief of these is Summit Avenue, which for a mile or more skirts the brow of the hill overlooking the picturesque Mississippi, and is lined on both sides with handsome residences.

Among the many handsome public buildings are the State capitol; the courthouse and city-hall, completed in 1890 at a cost of little more than one million dollars; the market-house, the Chamber of Commerce building, the United States custom-house, and a union depot. St. Paul's civic transportation facilities are excellent, and the system, many parts of which are continuous with the lines from Minneapolis, has 153 miles of electric and cable street-railway in operation.

The city's assessed valuation in 1901 was: Real estate, $71,067,159; personal property, $15,890,170; the tax levy per $100 being $2.69. The bonded debt (1902) was $8,598,152. St. Paul has a low death rate, being only about 9.60 per 1,000. The city has over thirty public parks or squares, ranging in size from Como Park, with 276 acres of lawn and lake, Phalen Park, Indian mounds, and Shadow Falls Parks, to small breathing-places occupying less than an acre. The civic budget for the year 1902 amounted to $2,779,723, about one-fourth of which ($692,100) was devoted to education. There are efficient fire and police departments, maintained at a combined annual cost of $400,000. The city owns its own water works, acquired in 1882 at a cost of $510,000, or, including subsequent expenditures to date (1902), of over $4,000,000; the annual revenue for which amounts to $342,407.

Eight large bridges cross the Mississippi River at St. Paul. Of the eight now in use, five are for foot-passengers, teams and street-cars, and three for railways. One bridge is a novelty in architecture of this kind, in that, in a length of a little more than half a mile, it has a grade of 100 feet, the southern end being to that extent higher than the northern. The Mississippi has been partially diked on the western bank, and government appropriations are available for a system of levees which will protect many acres of ground from any danger of overflow.

St. Paul is the center of a large railway system, 28 lines radiating therefrom in all directions. There are 14 lines eastward and four to the Pacific Coast, with terminals at San Francisco, Portland, Tacoma, Seattle and Vancouver. During the summer months, the season of greatest travel, about three hundred passenger trains arrive and depart daily from the union depot. These railway transportation facilities, besides the location of the city at the head of navigation on the Mississippi, has made St. Paul an important receiving and distributing point for a vast region, and has brought to it a trade whose volume is constantly increasing.

The churches of the city number about 180, among them being representatives of all the leading denominations. The public schools, which in 1901 numbered 54, including a large manual-training school and several kindergartens, had an enrollment of 25,000 pupils and expended during the year $651,500. The parochial and private schools had an enrollment of 8,000.

The institutions for higher education include Hamline University and Macalester College (both of which, see in these Supplements), St. Paul's Seminary, and St Thomas's Seminary, both Roman Catholic; and Concordia College (German Lutheran). There are numerous benevolent institutions, including homes, relief societies, social settlements and hospitals; and several libraries, among them the Minnesota Historical Society, 25,000 volumes; the Public, 40,000 volumes, and the State Law, 24,700 volumes.

According to the returns for 1900 reports were received from 1,591 manufacturing establishments, having a combined capital investment of $28,208,389, paying $7,669,805 to 17,593 workers and $19,464,570 for materials, from which products were turned out to the value of $38,541,030. Among the most important industries are slaughtering and meat-packing, printing and publishing, the manufacture of foundry and machine-shop products, fur-goods, lumber products, malt liquors, brick and stone.

The growth of St. Paul, like that of its sister city, Minneapolis, has been remarkably rapid. The population, in 1900, numbered 163,065.

ST. PAUL, a post village and the capital of Howard County, southeastern central Nebraska, 22 miles by rail N.N.W. of Grand Island, on the Middle Loup River, and on the Burlington and Missouri River and the Union Pacific railroads. It is surrounded by a farming and stock-raising region, and has large flour-mills. Population 1890, 1,263; 1900, 1,475.

SAINT PETER, an important manufacturing city, the capital of Nicollet County, southern Minnesota, on the west bank of the Minnesota River, 75 miles S.W. of St. Paul, and on the Chicago and Northwestern and the Chicago, St. Paul, Minneapolis and Omaha railways. It is surrounded by timber and prairie land, and has a number of manufactories, including grist-mills, a foundry and a furniture factory. A state insane asylum, erected at a cost of $500,000, is located here. It is the seat of Gustavus Adolphus College, a Lutheran institution organized in 1879 for the education of both men and women. In 1901, it had 21 instructors, 351 students, and a library of 10,000 volumes. Population 1890, 3,671; 1900, 4,302.

ST. PIERRE, a town, on the French island of Martinique, forming one of the Lesser Antilles group of the West India Islands. The island is of volcanic formation, dominated by Mont Pelee, situated near the northern end of the island, some four miles above the town of St. Pierre (pop. between 25 and 30,000). At 8 A. M. on May 8, 1902, Mont Pelee, which had been quiescent for over fifty years, burst forth in a terribly devastating eruption, which, in the brief space of twenty minutes, overwhelmed the town of St. Pierre with torrents of fire and lava, sunk the shipping in the harbor, and calamitously cut off all escape for the town's appalled inhabitants, the whole city and region being at once rendered desolate. The heartrending occurrence evoked the world's sympathies and commiseration and aid on behalf of the islanders. See Vol. XV, p. 592.

ST. REGIS FALLS AND LAKES. St. Regis Falls is a post village of Franklin County, northeastern New York, on the St. Regis River, and on the Northern New York railroad. It has excellent water-power, by means of which lumber-mills are run. Population 1900, 879. At the head of the St. Regis River, in the Adirondacks, are the ST. REGIS LAKES, upper and lower. They are situated in a region noted for its beautiful scenery and much frequented as a summer-resort. Neither of the lakes is large, but they are con-

nected with a network of neighboring lakes, so that one may travel through this region by boat many miles. Near the lower lake is St. Regis Mountain, having an elevation of 1,265 feet above the lake, which itself is 1,623 feet above the sea-level.

ST. ROQUE, Cape. See Atlantic, Vol. III, p. 18.

SAINT-SAËNS, Charles Camille, musician; was born in Paris on October 9, 1835, and was educated at the Conservatoire and under Halévy and others. He became organist of the Church of St. Merri in 1853 and of the Madeleine in 1858. He has written numerous operas, sacred dramas, and other musical works, including *La Princesse Jaune* (1872); *Le Timbale Argent* (1877); *Samson et Delilah* (1877); *Étienne Marcel* (1879); *Henry VIII* (1883); *Ascanio* (1890); *Phryne* (1893); *Chœurs d'Antigone* (1893); *Javotte* (1896); *Dejanire* (1898); *Les Barbares* (1901); *Parysatis* (1902); *Helene* (1903), and various others. He has also written many pieces for the organ, piano and orchestra, and is well known as a musical critic. W.F.J.

SAINTSBURY, George Edward Bateman, an English literary critic, was born at Southampton, Oct. 23, 1845, and educated at King's College School, London, and Merton College, Oxford. He graduated at the latter in 1868, and for the next ten years was engaged in educational work, filling masterships in Manchester, Guernsey and Elgin, and making a specialty in French and English literature. The subject of French literature he has particularly illuminated for English readers, while he has enriched many eras of English letters by the publication of critical works, full of lucid vigor and learning. His published works embrace a *Primer* (1880), and a *Short History of French Literature* (1882); *Specimens of French Literature, from Villon to Hugo* (1883); an edition of Corneille's *Horace* (1885) for schools; *Dryden*, in the English Men of Letters series; *Marlborough*, in the English Worthies; a *History of Elizabethan Literature* (1887); *Essays in English Literature* [1780–1860] (1891); *Essays on French Novelists* (1890); *Specimens of English Prose Style, from Malory to Macaulay* (1885); *Handbook of Nineteenth Century Literature* (1895); *The Flourishing of Romance and the Rise of Allegory* (1896); and *A Short History of English Literature* (1898). He is also the editor of a volume of *Political Verse* (1890); and a selection of *Seventeenth Century Lyrics* (1891). He contributed forty literary sketches to this Encyclopædia, most of them concerned with French biography, of which Corneille (Vol. VI, pp. 370–373), Montesquieu (Vol. XVI, pp. 808–811), and Rabelais (Vol. XX, pp. 201–205) are characteristic specimens.

ST. STEPHEN, a town and port of entry in Charlotte County, southwestern New Brunswick, Canada, 116 miles by rail W. of St. John, on the St. Croix river, opposite Calais, Maine, and on the Canadian Pacific and Shore Line railroads. It is the center of a lumbering district, and besides carrying on a large business in shipping lumber, it has a cotton-mill and other manufactures. Population 1891, 2,680; 1901, 2,840.

ST. THOMAS, a town and the capital of Elgin County, southwestern Ontario, Canada, 17 miles S. of London, on the Grand Trunk, the Michigan Central and the London and Port Stanley railways. It is situated in a region devoted to grain and fruit-raising, and is the seat of numerous industries, including saw, grist and flax mills, foundries, tanneries, a block-and-tackle factory, farm-implement works, breweries and others. There are also extensive car-shops of the Michigan Central railroad, employing about five hundred men. Population 1891, 10,366; 1901, 11,485.

ST. UBES. See Setubal, Vol. XXI, p. 730.

ST. VINCENT, West Indies, one of the British Windward Islands, in the Lesser Antilles, 22 miles south of St. Lucia, and 90 miles west of Barbados. It is 16 miles long, with a maximum width of 10 miles, and an area of 130 square miles. The interior is mountainous, rising in the volcanic summits of La Souffrière, and the grand Bonhomme, to a height of over 3,500 feet. In the productive belt of low coast land and the fertile valleys, sugar-cane is largely cultivated, and an active export trade is carried on in sugar, molasses, rum, arrowroot, cocoa, and dye woods. Kingstown, the capital, with Georgetown and Caliaqua, are the chief towns. St. Vincent has belonged to England since 1763 when France relinquished its neutral rights. It suffered from eruptions of La Souffrière in 1812 and in 1902, the latter being contemporaneous with the great disaster at St. Pierre (q. v.), Martinique. Population, 1900, 44,633 (mostly colored). C.L.S.

ST. VINCENT, Cape, the extreme southwest point of Portugal, province of Algarve, in lat. 37° 1′ 15″ N. Noted for the naval battle which occurred off it in 1797 between the English and Spanish fleets. See Nelson, Vol. XVII, p. 331.

SAIVISM. See Lamaism, Vol. XIV, p. 229.

SAKKARAH. See Pyramid, Vol. XX, pp. 128, 129.

SALA, George Augustus Henry, journalist; was born in London, of Italian ancestry, on November 24, 1828, and at first studied art. In 1860 he founded the magazine *Temple Bar*, and began a connection with the *Illustrated London News* which lasted for twenty-six years. He was a correspondent of the London *Daily Telegraph* in the American Civil War, in Italy with Garibaldi, in the Franco-German War of 1870, in the Russo-Turkish War of 1877, and in Australia in 1885. He wrote *A Journey Due North* (1859); *Dutch Pictures* (1861); *A Trip to Barbary* (1865); *From Waterloo to the Peninsula* (1866); *Rome and Venice* (1869); *Paris Herself Again* (1879); *America Revisited* (1882); *A Journey Due South* (1885); *Things I Have Seen* (1894), and other works of travel and several novels. He died on December 8, 1895. W.F.J.

SALADIN. See Egypt, Vol. VII, pp. 653–654.

SALADO RIO, a stream rising in the Andes, in the province of Salta, northwestern Argentine Republic, South America. It flows northeasterly

through the mountains, but on entering the plains turns southeasterly, and after a course of one thousand miles joins the Paraná in the province of Santa Fé. During a part of its course it flows through saline marshes, which impregnate its waters with salt. The river is shallow and unsuited for navigation.

SALAMANCA, New York, a town and village of Cattaraugus County, on the Alleghany River and on the Erie railroad, the Buffalo, Rochester & Pittsburg and the Pennsylvania systems, 61 miles south of Buffalo. Part of the Allegany Indian Reservation with 100 inhabitants is in the town limits which also includes West Salamanca, a village of 483 inhabitants. Good water power promotes the operations of saw and planing mills and an active lumber trade, and other industrial establishments include the car and repair shops of the Erie Company, machine shops, tanneries, etc. Population, 1900, of village, 4,251. C.L.S.

SALAMANDRIDA. See AMPHIBIA, Vol. I, p. 676.

SALANGA OR JUNK CEYLON. See MALAY PENINSULA, Vol. XV, p. 323.

SALAVERRY. See PERU, Vol. XVIII, p. 689.

SALDANHA, OLIVEIRA, a Portuguese chief. See PORTUGAL, Vol. XIX, pp. 568–569.

SALE, GEORGE (1690–1736). See MOHAMMEDANISM, Vol. XVI, p. 628.

SALEM, Illinois, the seat of Marion County, a city on divisions of the Baltimore & Ohio Southwestern, the Chicago & Eastern Illinois and the Illinois Southern railroads, 70 miles east of St. Louis, Mo. It is in a farming and fruit-growing region, and the manufacture of dairy products, the canning of fruits, coal mining and the manufacture of steel bridges are thriving industries. Population, 1890, 1,493; 1900, 1,642. C.L.S.

SALEM, Indiana, the seat of Washington County, a town 93 miles south of Indianapolis, and 40 miles northwest of Louisville, Ky., on the Blue River and on a division of the Chicago, Indianapolis & Louisville railroad. It is the market town of a farming region and has flour and lumber mills, furniture, hub and spoke factories, and stone quarries. Population, 1890, 1,975; 1900, 1,995. C.L.S.

SALEM, a city and the capital of Essex County, northeastern Massachusetts, on the Boston and Maine railroad. The city has a large coasting-trade, and is the landing-place for immense quantities of coal intended for shipment into the interior. The census returns for 1900 showed 37 industries, reporting 446 establishments, having an invested capital of $7,450,935 and a product for the year valued at $12,257,449. Among these the chief are foundries and machine-shops, manufactories of leather, boots and shoes, cotton, white lead, jute, cars and cordage. The city has numerous churches, public, private and parochial schools, seven national banks with combined capital of $2,000,000, two savings banks with deposits aggregating $12,000,000, gas and electric lights, a public library of 35,000 volumes, two daily and three weekly newspapers and a monthly periodical. Population, 1890, 30,801; 1900, 35,956. See also SALEM, Vol. XXI, pp. 220–221.

SALEM, Missouri, the seat of Dent County, a city of Spring Creek township and the terminus of the Cuba & Salem branch line of the St. Louis & San Francisco railroad, 98 miles southwest of St. Louis. It has flour and lumber mills and carries on an active trade in the output of farming, live-stock, and coal-mining interests. Population, 1890, 1,315; 1900, 1,481. C.L.S.

SALEM, New Jersey, the seat of Salem County, a city on Salem Creek 3½ miles from its outlet in the Delaware River, 14 miles southeast of Wilmington, Delaware, and 38 miles southwest of Philadelphia, Pennsylvania, both on the opposite bank of the river and with which Salem has regular steam communication. The city is the terminus of the Elmer and Salem division of the West Jersey & Seashore railroad, and is a busy agricultural and stock-raising center with considerable manufacturing interests, including iron foundries, machinery, glass and oil-cloth works, hosiery mills and tomato-canning factories. See also SALEM, Vol. XXI, p. 221. Population, 1890, 5,516; 1900, 5,811. C.L.S.

SALEM, New York, a town and village of Washington County, 56 miles northeast of Albany, on a division of the Delaware & Hudson railroad. The village is beautifully situated in the valley of White Creek and is a favorite summer resort. Among its educational institutions is Washington Academy founded in 1791. It has agricultural industries and slate quarries. Population, 1900, of village, 1,391. C.L.S.

SALEM, North Carolina, a city of Winston township, Forsyth County, adjoining Winston city, the county seat, the two being usually called WINSTON SALEM. Salem is a well built city of Moravian origin founded in 1766 on a branch of the Yadkin River, and sharing in the railway facilities of Winston which is on two divisions of the Southern railroad and on a division of the Norfolk & Western system, 110 miles west northwest of Raleigh. Salem is the seat of a celebrated Moravian college for women established in 1802. The local industries include the manufacture of textiles, paper, and tobacco. See WINSTON, Vol. XXIX, p. 570. Population of Salem, 1890, 2,711; 1900, 3,642. C.L.S.

SALEM, the largest city of Columbiana County, eastern Ohio, on the Pittsburg, Fort Wayne and Chicago and the Salem railroads, 13 miles E. of Alliance and about 70 miles W. of Pittsburg, Pennsylvania. It is situated in a rich farming country, yielding grain, cattle and wool. Coal is also produced. The city has large manufactories of engines, pumps, wire nails, stoves, organs and labels. Population, 1890, 5,780; 1900, 7,582.

SALEM, Oregon, the capital of the state and the seat of Marion County, a city on the east bank of the Willamette River and on the Portland and Redding (Cal.) division of the Southern Pacific Company railroad, 53 miles south of Portland. Passenger and freight steamers ply on the river, con-

necting intermediate towns and villages with Portland, and with Astoria at the mouth of the Columbia, and giving navigable communication with Pacific ocean steamer lines. Salem is a noted educational center of the region and among its institutions of learning are the Willamette Methodist University, a co-educational establishment founded in 1843, and the Institute of the Society of Friends, dating from 1892. Asylums for the deaf, dumb, blind, and insane, a penitentiary, and state reform school are also situated here. Salem is the commercial center for the productive agricultural industries of the Willamette valley, and its manufacturing establishments include flouring mills, foundries, breweries, and canneries. See also SALEM, Vol. XXI, p. 221. Population, 1890, 4,515; 1900, 4,258. C.L.S.

SALEM, Virginia, the seat of Roanoke County, a town on the Roanoke River, and on the Norfolk and Bristol division of the Norfolk & Western railroad, 60 miles west of Lynchburg, and 178 miles west of Richmond. Salem is an attractive summer resort on account of its scenic neighborhood and medicinal springs; among its educational institutions is Roanoke College (see page 599 in this volume). It is in a farming and tobacco-growing region, and manufactures machinery, tobacco, cigars, cigarettes, barrel staves and headings, textiles and bricks. Population, 1890, 3,279; 1900, 3,412. C.L.S.

SALE OF INTOXICATING LIQUORS, LAWS REGULATING. See LIQUOR LAWS, in these Supplements.

SALERATUS, a name formerly given to acid potassium carbonate (bicarbonate of potash), and now almost exclusively used for the corresponding sodium salt, extensively used in baking-powders and in medicine.

SALIANS. See FRANKS, Vol. IX, p. 636.

SALICACEÆ. See WILLOW, Vol. XXIV, p. 620.

SALFORD, England, a town of Lancashire, connected with Manchester on the east by several bridges across the Irwell River. It is an independent parish, county and parliamentary borough, although its manufacturing industries and commerce practically form part of Manchester, and share in the railway transport facilities, and in the seaborne advantages of the great ship-canal of its more important neighbor. The largest docks of the ship-canal are on the Salford side of the river; the cotton and other factories bear a fair proportion to the total of the combined establishments of the two towns; Salford cattle market is an important trading center of ancient date; and also notable is Peel Park with the museum and technical schools. (See MANCHESTER, Vols. XV and XXVIII, pp. 467 and 11, also CANAL, Vol. XXVI, p. 45.) Population, 1901, of parish, 105,335; of county borough, 220,957. C.L.S.

SALIDA, Colorado, a city of Chaffee County on the Arkansas River, and on the Denver and Grand Junction division of the Denver & Rio Grande railroad, at the junction of the Monarch and Otto branch lines, 90 miles west of Pueblo. It is an agricultural and silver-mining town, and among its institutions are an academy and an hospital of the Denver & Rio Grande railroad, which has large construction and repair shops here. The Poncha Hot Springs is visited by health seekers. Pop., 1900, 3,722. C.L.S.

SALIENTIA, a name given by certain authors to the order of amphibians which contains the toads and frogs. The term is synonymous with *Anura*, this name being the one commonly applied to the tailless amphibians. It is also equivalent to *Batrachia* in the restricted sense of that term. The name is not often used by recent authors. The name has also been applied to an order of mammals containing the kangaroos and similar forms.

SALINA, Kansas, the seat of Saline County, a city and important railway junction 186 miles west of Kansas City, on Smoky Hill River and on divisions of the Atchison, Topeka & Santa Fé, the Chicago, Rock Island & Pacific, and the Missouri Pacific railroads, and on three divisions of the Union Pacific system. The city is well built and is a winter resort; among its many educational institutions is the Kansas Wesleyan (Methodist Episcopal) University, a co-educational seat of learning established in 1886; its teaching staff comprises 26 instructors and it has an average annual attendance of over 600 students; the Salina Normal University is also situated here. The Smoky Hill River furnishes abundant power for numerous manufacturing establishments which include flouring and lumber mills, baking powder, ice, brine, gypsum, cement and brick works. Population, 1890, 6,149; 1900, 6,074. C.L.S.

SALINAS, California, the seat of Monterey County, a city at the junction of the Pajaro Valley Consolidated railway with the Southern Pacific Company system, 18 miles east of Monterey on the Pacific. Its industries are connected with sugar beet, fruit, stock and wool raising. Population, 1900, 3,722. C.L.S.

SALINEVILLE, a post village of Columbiana County, eastern Ohio, on the Cleveland and Pittsburg railroad, 30 miles S.S.E. of Alliance and about 70 miles W.N.W. of Pittsburg, Pennsylvania. In addition to coal-mining, which is the principal industry, there are flour-mills, potteries, and brick-works. The surrounding country is given largely to agriculture. Population, 1890, 2,369; 1900, 2,353.

SALINOMETER. See HYDROMETER, Vol. XII, p. 573.

SALISBURY, Connecticut, a town of Litchfield County, 64 miles west northwest of Hartford on the Hartford and State Line division of the Central New England railroad. It is picturesquely situated on the Housatonic River near the Great Falls which have a perpendicular drop of 60 feet, affording great water power for numerous manufacturing industries, including flouring, lumber, and wool mills. Near the town are valuable deposits of hematite iron ore which furnish the raw material for blast furnaces, foundries, machine shops and cutleries. Salisbury first set-

tled in 1720, was incorporated in 1741. Population, 1891, 3,420; 1900, 3,489. C.L.S.

SALISBURY, a post village and the capital of Wicomico County, southeastern Maryland, on the navigable Wicomico River, and on the New York, Philadelphia and Norfolk and the Baltimore, Chesapeake and Atlantic railroads, 32 miles N.N.E. of Crisfield. The surrounding district produces grain, fruit and lumber, of which large quantities are exported. The village has an academy, planing-mills and flour-mills. Pop., 1900, 4,277.

SALISBURY, North Carolina, the seat of Rowan County, a city and railway junction of three divisions of the Southern railroad on a branch of the Yadken River, 118 miles west of Raleigh. It is an educational center for colored people, among its institutions being Livingstone College founded in 1879 by the African Methodist Episcopal Church, and a state normal school, also for colored students. In an extensive granite-quarrying, iron-mining, and farming region, its commerce and industries are varied, the factories including the construction and repair shops of the Southern Railroad Company, cotton mills, foundries, etc. Population, 1900, 6,277. C.L.S.

SALISBURY, Marquis of, Robert Arthur Talbot Gascoyne-Cecil, statesman; descendant of the illustrious Burghleys and Cecils of Tudor and Stuart days; was born at Hatfield House, England, on February 3, 1830, and was graduated from Eton in 1847, and from Christ Church, Oxford, in 1849. He was then only Lord Robert Cecil, second son of the Marquis of Salisbury, with "small expectations," so he went to Australia to seek, but did not find, a fortune in the gold mines. Returning home he was made a fellow of All Souls', Oxford, in 1853, and in the same year entered Parliament as a Conservative from Stamford. He made himself a force in the House of Commons, opposing the abolition of church rates in 1858, and supporting Disraeli's reform bill in 1859. He paid especial attention to church, educational, and foreign affairs, and was a particularly studious, sarcastic and effective speaker. He was at this time also a frequent contributor to leading reviews, and even to the editorial page of a London newspaper. In 1865 his elder brother died, and he thus became Viscount Cranborne and heir to the peerage. In that year he vigorously opposed Mr. Gladstone's reform bill, and the next year became Indian secretary in Lord Derby's cabinet, but revolted against the Derby-Disraeli reform bill, and resigned from the cabinet in order to fight against it. The death of his father in 1868 translated him to the House of Lords, where he became one of the Conservative leaders, especially in opposition to the disestablishment of the Irish Church. He was chancellor of the University of Oxford in 1869, supported the Peace Preservation bill, but opposed the Irish Land Act in 1870, and was much concerned with the bill for abolishing religious tests in the universities. He became Indian secretary again in 1874, but soon quarreled with Disraeli, who described him as "a great master of gibes and flouts and jeers," and whom Salisbury in turn distrusted and perhaps despised. He was envoy to the Constantinople Conference of 1876–77, disobeyed and quarreled with Lord Derby, and the next year succeeded Derby as foreign secretary. He was the colleague of Beaconsfield (Disraeli) in the Berlin Conference of 1878. In 1881 he became leader of the Conservative party, then in opposition. When the Gladstone government went out in 1885 he became prime minister and foreign secretary for a short time, and resumed them in 1886, when the new Gladstone government was wrecked on Irish home rule. In 1892 the Liberals won, and he was retired to the Opposition, where he defeated Gladstone's home rule bill in the House of Lords. In the fall of 1895 he again became prime minister, at the head of the Conservative-Liberal Unionist coalition, and had a most eventful administration, dealing with the Armenian massacres and the whole Turkish question, the Venezuela dispute with the United States, the Jameson raid in the Transvaal, and the menacing interference of Germany, the reconquest of the Soudan, and the consequent jealousy of France, the Cretan insurrection, the Greco-Turkish War, and the international complications which it involved, and finally the war in South Africa with the Boer states. In all these and many other matters he showed himself a prudent and masterful statesman. He was essentially a student and an aristocrat. He seemed like one of his ancestors of Elizabethan days transplanted to the nineteenth century. He was an ardent student of science, especially of chemistry and electricity, and as president of the British Association in 1894 delivered a profound philosophic address, which stands among the modern classics of science. He died on August 22, 1903. W.F.J.

MARQUIS OF SALISBURY.

SALISBURY, Robert Cecil. See Cecil, Vol. V, pp. 245, 246.

SALIVA. See *Alimentary Canal*, under Nutrition, Vol. XVII, pp. 691, 692.

SALIVATION. See Mercury, Vol. XVI, p. 39.

SALMON, a fish of the genus *Salmo;* is found in all the northern parts of America, Europe and Asia. The natural home of the salmon is about the mouths and estuaries of great rivers, and it cannot be stated as belonging exclusively to either the marine or the fresh-water fishes. Owing — as it is supposed — to the fact that the fish obeys a natural instinct to return, in the spawning-season, to its own birthplace, the salmon annually ascends in the summer to the head of the rivers, where the eggs are deposited in furrows which the female digs in the gravel. After remaining here for some weeks, the salmon, both

male and female, return to the sea. For an extended account of the spawning and the migrations of the salmon, and for the various species, see SALMONIDÆ, Vol. XXI, pp. 235, 236.

The strength of this migratory instinct is so great that scarcely any obstacle, such as rapid and waterfall, prevents the salmon from ascending in vast, almost countless shoals. Salmon have been seen to leap a vertical fall 16 feet in height; and when, at times, the fish falls short by one or two feet of leaping the entire distance, it is able to remain suspended in the falling water and to clear the balance of the space by a switch of its tail. Nothing is known of the life of the salmon in the open sea, but their growth while there is so rapid that they have been known to increase within a few months from a weight of 2 ounces to from 6 to 10 pounds. It has been known to reach over 100 pounds in weight, but the average is not higher than 15 to 25 pounds. In their migrations from the sea to the spawning-grounds the salmon are taken in incredible numbers. A writer, in describing these shoals of salmon in the Fraser River of British Columbia, says: "At certain times the river is almost choked with the salmon forcing their way to the upper waters. They are so numerous that it seems as though one could walk across on their backs."

On the Pacific Coast of America there are five species, which are collectively called "Pacific salmon"; and they form the genus *Oncorhynchus*. One of these, the hump-backed salmon, *O. gorbuscha*, weighs 3 to 6 pounds, and ranges from Alaska to the Sacramento River. Another, the dog-salmon, *O. lagocephalus*, ranges nearly as far south, and reaches 12 pounds in weight. Another, the silver salmon, *O. Kisutch*, attains to 8 pounds, but is of small economic value. The blue-back salmon, *O. lycaodon*, reaches a weight of 8 pounds, and is abundant in the Columbia and its tributaries. It comes from the sea with a beautiful bright-blue back and silvery sides; but the males, when they return toward the ocean, are of a red color, and are called "red-fish" by the river-men. This fish ranks second in value among the Pacific Coast salmon.

The first place is held by the quinnat or king-salmon, *O. quinnat*, the largest, most numerous and most important of the Pacific Coast salmon. It frequently reaches a weight of from 80 to 100 pounds, and enters in large numbers into the Sacramento River, but is far more abundant in the Columbia and the rivers still farther north. About thirty million pounds of salmon have been annually taken in the Columbia River alone. Extensive canneries have been erected along the Columbia and other Pacific Coast rivers, wherein the fish are preserved for shipment. The fish are first cleaned and washed, after which they are placed in vats of salted water, where they are allowed to remain long enough to thoroughly cleanse. Their tails, fins and heads are removed, and they are cut by machinery to the exact necessary size to fill the cans. The cans are filled with the raw fish, along with the brine; after which the cans are soldered up and lowered by machinery into steam-boilers at a temperature of 240°, where they are cooked for an hour. After removal a hole is punched in each can to allow gas to escape, after which it is quickly soldered again. The cans are then subjected to a second cooking, after which a spray of cold water is thrown over them. If the can is swollen it is rejected; if the sides hollow in as it cools, it shows that a vacuum exists and the can is perfect. Columbia salmon are exported to all parts of the world.

As the fish run up-stream they are taken in seine and pound nets, gill-nets, various trap-contrivances and fishing-wheels. (The seine-net is described under the head of *Trawl*, in the article on FISHERIES, Vol. IX, pp. 214–218.)

Pound-nets are arranged with a long, straight stretch of upright net for a leader, by which the fish are guided at length into a sort of pound or net inclosed on all sides, where they keep swimming around always in the same direction without being able to find the exit. The gill-net is a net with large meshes, which admit only the heads of fish of a certain size. In trying to pass through the meshes the fish are caught and held by the gills. Both these nets, as well as the fyke-net (somewhat similar to the pound-net), are set in the water by driven stakes. One of the most ingenious devices is the fishing-wheel. Only rivers with swift currents are available for its use, but in the Columbia and other Pacific Coast streams it is most effective. It consists of a large water-wheel of the under-shot pattern, provided with large wire scoop-nets which face down-stream. These wire baskets seize the fish as they come swimming up-stream; the revolving wheel lifts them from the water and tumbles them out upon an inclined chute, through which they slide into a receptacle. The total Pacific Coast salmon fisheries in 1889 reached 110,913,702 pounds, with a value of $3,458,006, of which California, Oregon and Washington provided nearly three fourths, and Alaska the balance. Besides this, the Fraser and other British Columbian streams furnish an enormous supply, which, taken altogether, threatens to extinguish the supply within a short time unless the United States Fish Commission shall succeed in replenishing the rivers through its strenuous efforts at restocking them by artificial means. For a description of the methods of artificial propagation of salmon and other fishes, see PISCICULTURE, Vol. XIX, pp. 135–138. For the *Game-Fishing* of salmon, see ANGLING, Vol. II, pp. 36–37.

SALMON, GEORGE, theologian and mathematician; was born in Dublin, Ireland, on September 25, 1819, and was graduated from Trinity College in 1839. He became a fellow of Trinity in 1841, regius professor of divinity in 1866, and provost in 1888, becoming also a fellow of the Royal Society and the recipient of many honorary degrees. His mathematical writings comprise *Analytic Geometry; Modern Higher Geometry; Conic Sections; The Higher Plane Curves*, and *Geometry*

of Three Dimensions. In theology he wrote *College Sermons* (1861); *The Reign of Law* (1873); *Non-Miraculous Christianity* (1881); *Gnosticism and Agnosticism* (1887); *An Introduction to the New Testament* (1888), and *The Infallibility of the Church* (1888). He died in January, 1804. W.F.J.

SALMONEUS, King of Elis. See GUNPOWDER, Vol. XI, p. 282.

SALMON-TROUT. See SALMONIDÆ, Vol. XXI, p. 232.

SALOL, a drug of comparatively recent introduction into the pharmacopeia. It is a compound, white, crystal (C^{13} H^{10} O^3), obtained from salicylic and carbolic acids in the proportion of six to four; is a substitute for salicyclic acid; acts internally as an antiseptic; used sometimes in rheumatism, cholera and fermentive troubles of the alimentary canal.

SALONA. See SPALATO, Vol. XXII, p. 380.

SALPAIDÆ. See TUNICATA, Vol. XXIII, p. 655.

SALSAFY, OYSTER-PLANT OR VEGETABLE OYSTER. See HORTICULTURE, Vol. XII, p. 300.

SALT. (For general article on salt, its manufacture, and various uses, see SALT, Vol. XXI, pp. 239–246.) In the United States there is almost an inexhaustible supply of salt, most of which is taken from salt springs, while many places on the coast offer facilities for its production. The product in 1900 was 15,187,819 barrels (280 lbs to 1 barrel). The bulk of this was from subterranean brines; and the remainder from lakes or natural deposits, and from seas or bays. Salt is produced in fifteen states, but about sixty-seven per cent of the whole product comes from Michigan and New York, as can be seen from the following table, which is compiled from the census of 1900:

UNITED STATES AND TERRITORIES.	AMOUNT OF SALT MANUFACTURED.	PERCENTAGE OF TOTAL PRODUCT.
	Barrels.	
United States	15,187,819	100.0
Michigan	5,206,510	34.3
New York	4,894,852	32.2
Kansas	1,645,350	10.8
Ohio	1,460,516	9.6
Utah	235,671	1.5
West Virginia	221,534	1.5
California	640,420	4.2
Texas	312,436	2.1
All others*	570,530	5.4

The reason that more salt is not produced in the United States is chiefly because of the great amount and cheapness of production of the article in England, and because large quantities are brought over in vessels as ballast. The principal expense in salt manufacture is the cost of fuel, and this furnishes one reason why Michigan takes first rank as a salt-producing state. For, aside from the excellent quality of the brine, they are able to secure cheap fuel by using saw-dust and other refuse from saw-mills, including the exhaust steam. The principal wells in this state are near Saginaw Bay.

In Nevada, salt is chiefly obtained from salt lakes, while in Arizona there is one lake which dries up each year and leaves a remarkably fine deposit of salt, which settlers haul away in wagons.

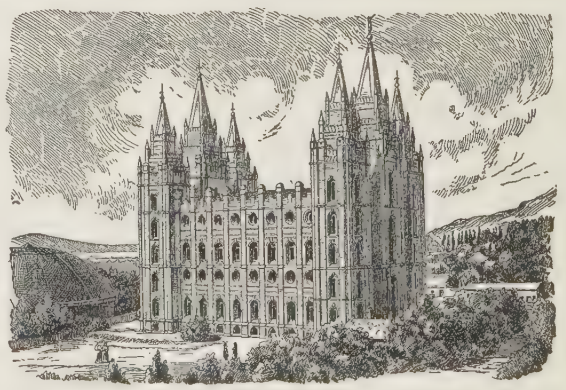
Salt wells average in depth from 1,000 to 1,900 feet.

Rock-salt is mined in four states, but the quantity produced is relatively unimportant, although it increased from 312,000 bushels in 1880 to 7,066,000 in 1890. The most important mine is on Avery's Island, in the Gulf of Mexico, where about one million bushels were produced in 1890.

SALT CREEK OR RIVER, a stream in northern Kentucky, noted for its tortuous, winding course. After flowing about 150 miles it joins the Ohio, 17 miles S.W. of Louisville. The derivation of the phrase "sent up Salt River" or "rowed up Salt River," as applied to a defeated political party, has been variously explained, one of the best explanations placing the origin of the phrase in 1832, when Henry Clay, candidate for President, having an engagement to speak in Louisville, Kentucky, hired a boatman, who turned out to be a Jacksonian Democrat, to row him up the Ohio River. The boatman, pretending to lose his way, rowed Clay up Salt River instead, so that the latter did not reach his destination till the next day—just in time to hear of his defeat.

SALT LAKE. See UTAH, Vol. XXIV, p. 25.

SALT LAKE CITY, a city of Utah. Salt Lake City in 1890 was the center of five railroads, the Great Salt Lake and Hot Springs, the Rio Grande Western, the Salt Lake and Los Angeles, the Union



MORMON TEMPLE, SALT LAKE CITY.

Pacific and the Utah Central. Since 1880 two notable buildings have been completed: the city and county building, completed in 1894 at a cost of $900,000, and the Great Temple, a massive structure of granite, 40 years in course of construction, estimated to have cost not far from $12,000,000, completed April 6, 1892, and formally dedicated just one year later, on the sixty-third anniversary of the organization of the Mormon church. The Temple is one of a group of buildings, including the assembly hall and tabernacle, occupying a tract of ten acres in the heart of the

*Illinois, Kentucky, Louisiana, Massachusetts, Nevada, Virginia, Pennsylvania, and Oklahoma.

city, and the building from beginning to end was the work of Mormons. It has an extreme length of 186½ feet, a width of 99 feet, and with the towers covers an area of 21,850 square feet. The loftiest tower is 222 feet 6 inches high, 26 feet square at the base, and is surmounted by a statue, 12 feet in height, of the angel Maroni. The figure is of hammered copper, plated with gold leaf. The first and second floors of the building contain the ceremonial rooms of the Mormon church, and the upper floor contains an assembly-room with a seating capacity of about three thousand.

The growth of the city since 1880 has been rapid, and since that time the strength of the non-Mormons, or Gentiles, has steadily increased, until in 1890 they gained control of the municipal government. The city is the center of mining interests for Utah and the neighboring states, and is the trade and shipping-center of a region made rich in agricultural production by irrigation. The returns of 1900 showed 432 industries, capitalized at $4,048,906, and having a product valued at $6,109,409. Among these industries the chief are planing, paper, flour and woolen mills, foundries and machine-shops, tannery, breweries, sampling-mills and smelting-works. The city has gas and electric lights, is traversed by horse-car lines and electric street-railways, contains churches representing the leading denominations; has good public schools, several libraries, 4 daily, 3 semiweekly, 10 weekly, 2 semimonthly and 5 monthly periodicals. The assessed valuation of city property in 1899 was $65,000,000, and the tax-rate 6½ mills. Salt Lake City is the seat of the University of Utah (non-sectarian), a co-educational institution, supported by the state, and in 1893 granted by Congress the Fort Douglas reservation as a site for buildings. The university, which was founded in 1850, had in 1900–01 28 instructors, 643 students, and a library of 20,000 volumes. Population 1880, 20,768; 1890, 44,843; 1900, 53,531. See also SALT LAKE CITY, Vol. XXI, p. 247.

SALTO OR SALTO ORIENTAL, Uruguay, the capital of the department of Salto, a town and port at the foot of the rapids of the Uruguay River, and at the head of steamer navigation, opposite Concordia in the Argentine Republic, 260 miles by rail northwest of Montevideo, and 285 miles by river north of Buenos Ayres. It exports precious gems, and the farm and animal products of a fertile agricultural and stock-raising region. Population, 12,000. C.L.S.

SALTONSTALL, GURDON, an American public man; born in Haverhill, Mass., March 27, 1666. He graduated at Harvard in 1684, and was ordained in New London in 1691. On the death of Gov. Fitz John Winthrop, he was elected to fill the unexpired term, and was subsequently annually elected governor for 16 years. He was influential in forming the Saybrook Platform, and in the establishment of Yale College at New Haven. He died in New London, Conn., Sept. 20, 1724. E.E.T.

SALTONSTALL, LEVERETT, an American public man; born in Haverhill, Mass., June 13, 1783. He graduated at Harvard College in 1802; studied law, and began practice at Salem in 1805. He was a member of the State Senate in 1831; mayor of Salem, 1836–38; a Presidential Elector in 1837; Representative in Congress from Massachusetts, from Dec. 5, 1838, to March 3, 1843. He died in Salem, May 8, 1845. E.E.T.

SALTONSTALL, RICHARD, an American jurist; born in Haverhill, Mass., June 14, 1703. He graduated at Harvard College in 1722, and represented Haverhill in the General Court in 1728. In 1736 he was appointed a judge of the Superior Court. He was chairman of the commission for settling the boundary line between Massachusetts and New Hampshire in 1737. He died Oct. 20, 1756. E.E.T.

SALTONSTALL, SIR RICHARD, an American pioneer; born in Halifax, England, in 1586. He came over with Gov. Winthrop in 1630, and was an Assistant in that year. He was instrumental in the settlement of Watertown, Mass., but became discouraged and returned to England in 1631. In 1651 he wrote a letter of reproof to Cotton and Wilson, for their tyranny in whipping and imprisoning in matters of conscience. He died in England about 1658. E.E.T.

SALT RANGE OR KALABAGH MOUNTAINS. See PUNJAB, Vol. XX, p. 113.

SALT RHEUM, a vague and popular term in the United States, applied to all non-febrile cutaneous affections except ringworm and itch, especially of the eczematous and herpetic forms. The term is not now used by physicians, nor is it found in modern medical dictionaries. See SKIN DISEASES, Vol. XXII, pp. 130, 131.

SALTS. See CHEMISTRY, Vol. V, pp. 421, 422.

SALTUS, EDGAR EVERTSON, an American author; born in New York, June 8, 1858. He was educated at St. Paul's School, Concord, N. H., at the Sorbonne, Paris, and in Heidelberg and Munich, Germany; and graduated at the Columbia College Law School in 1880. He has devoted himself entirely to literary work, is well known as a novelist, and is the author of *Balzac: A Study; The Philosophy of Disenchantment; The Anatomy of Negation; Mr. Incoul's Misadventure; The Truth About Tristram Varick; Eden; Mary Magdalen; Imperial Purple; A Transaction in Hearts; When Dreams Come True; The Pace That Kills.* E.E.T.

EDGAR E. SALTUS.

SALTUS, FRANCIS SALTUS, poet; was born in New York city on June 12, 1850, and was educated chiefly in Europe. He was a precocious scholar, and began publishing poems in 1873. He was a prolific writer of poems in all conceivable keys, from the most solemn and stately to the

most whimsical and rollicking. Under the pen-name of "Cupid Jones" he wrote much for the press. He published several volumes of poems, a monumental *Life of Donizetti*, monographs on Rossini, Bellini and other composers, numerous short stories and other works. He composed two operas, *Mary Stuart* and *Joan of Arc*, and several operettas, and hundreds of songs and minor pieces. He died on June 25, 1889. W.F.J.

SALVADOR, Republic of. (For general article, see Salvador, Vol. XXI, p. 281.) The area of the republic is estimated at 7,225 English square miles, divided into 14 departments. The population according to a census of Mar., 1901, was 1,006,848, giving an average of 139 inhabitants to the square mile, being twenty times that of the average of the other states of Central America. Aboriginal and mixed races constitute the bulk of the population, among whom live about 20,000 whites, or descendants of Europeans. The capital is San Salvador, founded in 1528, with 59,540 inhabitants in 1901. The city has often been destroyed by earthquakes and volcanic eruptions, the last time on April 16, 1854, when it was overwhelmed by almost total ruin, in consequence of which most of the inhabitants erected new dwellings on a neighboring site, at present called Nueva San Salvador. The new capital again was partly destroyed in 1873 by a series of earthquakes and eruptions, and suffered again severely in 1879.

Government. The constitution proclaimed in 1864, and modified in 1880, 1883, and 1886, vests the legislative power in a Congress of 70 deputies, 42 of whom are proprietors. Election is for one year, and suffrage is universal. The executive power is in the hands of a President, whose tenure of office is limited to four years, and who is assisted by a ministry of four members. In 1895 the republics of Honduras, Nicaragua, and Salvador united to form the greater republic of Central America, to be known as the Republic of Central America when Guatemala and Costa Rica accepted the agreement. The governments signing did not renounce their autonomy and independence in internal affairs. In 1899 the attempt to give practical effect to the agreement failed, and the federation was dissolved.

Education and Justice. Education is free and obligatory. In 1893 there were in Salvador 585 primary schools, with 29,427 pupils; 18 higher schools (including two normal and one polytechnic school), with 1,293 pupils; and a national university with faculties of jurisprudence, medicine, natural sciences, and engineering, attended by 180 students. In the capital is a national library and museum, and in the republic 28 newspapers are published. Justice is administered by the supreme court of justice, by several subordinate courts, and by local justices.

Industry. The population are largely employed in agriculture, and produce chiefly coffee, indigo, sugar, and tobacco. But they also produce gold, silver, copper, iron, mercury, and coal. The following shows the state of commerce:

	1890.	1896.
Imports subject to duty	$2,405,202	$3,347,718
Exports	7,578,734	7,485,384

In 1896, 338 vessels entered the ports. In 1898 there were about 73 miles of railway. The republic has been a member of the Postal Union since 1879. In 1896 there were 121 telegraph stations and 18 telephone stations.

Finance. The revenue, largely from custom and excise duties, and expenditure are shown by the following table:

	1890.	1894.	1900.
Revenue	$4,151,457	$8,818,000	$6,293,462
Expenditure	5,442,315	8,569,000	6,794,874

The national debt, internal, was in 1896 placed at about $9,250,000. The foreign debt (1899) was 3½ million dollars. The country has been on a gold standard since Aug., 1897; and the unit piece is the dollar, worth about 72 cents in United States money. The metric system was introduced in 1885.

SALVATION. See Paul, Vol. XVIII, pp. 435–437; and Buddhism, Vol. IV, pp. 383–384.

SALVATION ARMY, a religious missionary organization that began in 1865, in London. It was founded by William Booth (q.v., in these Supplements) and his wife, who started out from the Methodist New Connection to reclaim the neglected and degraded. They organized their work in the east end of London, and named it the "Christian Mission." He had found small encouragement for his evangelism in the churches, and the usual methods of revivals, committees, conferences and organizations seemed to fail of their purpose until the military idea was, to use his phrase, revealed to him. Working on the lines of Primitive Methodists, Booth gathered about him many earnest converts, drawing some of them from gin-palaces and the haunts of extreme depravity. The work made friends among the upper and middle classes, who became, in particular, supporters of Mrs. Booth. It was in 1878 that the mission was reorganized on its military model, and with Mr. Booth designated as general, it took the name of "Salvation Army." This expedient attracted immediate attention, and some applauded while others opposed. The army had to fight its way to peaceable recognition, for its street meetings, both in European and American cities, were broken up at times by the police and the leaders put in jail or fined; although nowhere was this sort of opposition protracted.

While the fatigue uniforms of the men, the blue blouses, poke-bonnets with red trimmings of the women, the street parades with banners and the sound of timbrels, drums and songs on the highways arrested passers-by and drew crowds to hear the preacher, there was a deeper significance in the military system. The absolute authority of the general and the required subordination of his officers and the rank and file of the army have

brought to it the efficiency of disciplined organization. Perhaps here, too, will be found the most serious menace to the perpetuity of the mission. How long the will of the commander-in-chief will be respected as to questions of faith, as well as to the control of the soldier's service, remains to be seen; but from the beginning all authority has been his.

In doctrine the army holds to the simplest tenets of evangelicism, and is more mystical than dogmatic. It holds that the work of Jesus is the sole and universal expiation of sin; that its virtue is appropriated by faith; that the Bible is a book of plenary inspiration needing no glasses, and having its best interpretation by simple and godly hearts; that sanctification may be fully received by the believer by faith, and consciously; that religion issues in a pure and self-denying life. Sacraments there are none, yet there is nothing to hinder a soldier of the army from seeking them elsewhere, although membership in churches is not encouraged—rather, the reverse, it is gently discouraged. Infants are publicly dedicated to God and the army; marriages are public contracts, solemnized, where the law of the land permits, "under the flag," each pledging the one not to hinder the other in the service of the army. Admission to the army comes with signing "the articles of war," which involves a profession of love to God and faith in Christ, and promises to live for God and the army and to obey all lawful orders. It is this solidarity of organization with its constantly stimulated *esprit de corps*, that makes safe a large degree of freedom in thought and spiritual life that the soldier enjoys, but everywhere loyalty, devotion to the service, enthusiasm, glad obedience are expected, and also obtained to a remarkable degree. Service is voluntary, and one may withdraw from it at pleasure. There is no pay regulation, and those who give all their time are guaranteed only enough for a frugal support.

In the army, sex is allowed to work no distinction of rank, duty or opportunity. "There is neither male nor female, for ye are all one in Christ Jesus." The women exhort, lead meetings, parade, explore slums, sell the *War Cry* on street or in rum-shops, hold rank from corporal to commander of a country—and the men can do no more. Neither is the least preference shown to them. Each does that that each can do best. All are to engage in working for the salvation of sinners, so long as there is one living unreclaimed.

The characteristic dress is not uniform, but has adaptations to the customs of a country. It is the same in Great Britain and the United States. In India it is a white garment, patterned there, as everywhere, after the costume of the common people.

Barracks is the name of the place where meetings are held, and it is no small part of parades and street demonstrations to induce people to follow to the barracks. These places are generally hired rooms in populous but obscure parts of the city, and in truth, thus far, most of the work of the army is done in cities, although it has horseback brigades for use in rural districts.

The society is intensely religious and evangelizing, and its distribution follows this conception. In its grand propaganda it divides the world into its military jurisdiction. Each country is mapped out into districts under the care of an officer, usually called a major. His subordinates are captains and lieutenants, in charge of cities and towns. Large divisions are of higher commanding grade.

The property of the society is entered on a deed-roll, under the control of the general of the army, though he is credited with never drawing his income from it. Indeed, the people who compose the army are generally humble people, though they have the same sympathy that was given in the middle ages to the Franciscans. The income is derived from sales of publications, from contributions made at barrack-meetings, from friends, from an annual day of abstinence, corresponding to Lent, and from what may come from associates of the army, who are organized into a subsidiary corps.

In 1880 the army opened its operations in France. The same year it sent six "Hallelujah Lasses" to Castle Garden, in New York, who went thence to Harry Hill's slum, on the East Side, under the direction of G. S. Riallton. This scheme was reinforced the next year by the expedition of Major T. E. Moore, who began his work in Philadelphia. In 1883 he secured an act of incorporation for the society, and thus prepared the way for a separation, under Ballington Booth, of an American branch, "The Volunteers," from the parent society. Moore was succeeded first by F. Smith, and in 1887 by Ballington Booth, who married Maud Charlesworth, and who was born about 1858, and had been a principal of a London training-school, an inspector of the army around the world. In 1896 he separated from the parent society, for reasons not yet made plain, to organize "The Volunteers." It is understood that he wished a greater freedom of movement, corresponding to the democratic organization of American society, more local self-control and a less social restriction to classes.

At the time of this first separation the Booth family, either by direct descent or by marriage, stood in the following relation to the army: "Commander and Mrs. Booth-Tucker succeeded to the oversight of the army in this country. Commander Booth-Tucker was formerly a magistrate in her Majesty's service in India, and is a man of considerable experience with the natives of that country. His wife, Emma Booth-Tucker, is the second daughter of General Booth, and is a woman possessed of some platform ability and considerable experience in army work. The rest of General Booth's family are: William Bramwell, the eldest son, who assists his father and is the chief executive in London; Herbert Howard, the third son, who is in command of Australia;

Catherine, the eldest daughter, in charge of the work in Belgium; Eva, the third daughter, in Canada; and the youngest daughter, Lucy, in France."

At the time of this separation from the old movement the disposition of forces was as follows in the United States: Five hundred and thirty-two corps, 2,011 officers, 17,269 soldiers, 3,262 recruits, 6 rescue homes, 25 training-garrisons, 3 food and shelter depots; *War Cry* (weekly organ), a combined circulation of 75,000 copies; *Conqueror* (monthly magazine), 15,000 copies. The army had found employment during the year for 9,803 persons.

The recruits for the army are from all conditions of life, and innumerable converts are not qualified to teach or exhort. For these there are over forty training-schools scattered through the jurisdiction. Other institutions, to promote emigration, to reform debased converts, thriftless from the slums, and to deal with the whole problem of outcasts, grew out of General Booth's book, *In Darkest England, and the Way Out* (1890). Large sums were intrusted to him to carry out his schemes, none of which have been sufficiently tried to enable one to form a judgment of their social value.

The army has spread its operations over Great Britain, France, Switzerland, Sweden, Canada, Australia, New Zealand, Tasmania, India, Ceylon, South Africa, Germany and the United States. Wherever it goes it conforms to the conditions that confront it, save in its evangel of salvation through Jesus Christ. It conforms in costume, in adjustments to suit the high and the lowly, in every way that will secure a hearing. It would be all things to all men in an apostolic sense, and it believes itself in possession of apostolic equipments and methods.

In 1895 there were 12,050 officers, composed of men and women whose lives are entirely given to the work; 4,345 corps or societies, operating in 38 countries and colonies in 34 languages. There were some 2,098,631 meetings held annually, outdoors and in. The number of periodicals printed or published is 44, with a combined circulation of over a million. The annual rental-roll is over $1,000,000. The amount of property owned by this organization now exceeds $4,000,000, and the annual income is $3,645,000. The United States division of the Salvation Army has to-day 2,125 officers, 654 corps or societies, 16 slum posts, 6 rescue homes, 5 food and shelter depots. The organization also has in the United States, cavalry brigades, out-riders' circuits, maternity homes, labor bureaus, women's shelters, and an inquiry department, which looks up missing friends and relatives. They publish the *War Cry*, one edition in New York City and another on the Pacific Coast; a Swedish and also a German edition in New York City, with a combined circulation of 90,000; *The Young Soldier*, weekly circulation 35,000; and *The Conqueror*, monthly, 16,000.

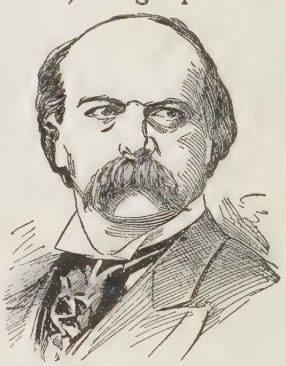
The following is a statement in detail of the distribution of the Salvation Army in the world:

Countries.	Corps or Societies.	Officers.
United Kingdom	1,338	4,306
Australia	831	1,527
United States	730	2,577
France and Switzerland	219	435
Sweden	203	658
Canada	355	809
New Zealand	188	313
India	188	555
Holland	63	312
Denmark	72	257
Jamaica	42	83
Norway	65	253
Germany	21	64
Belgium	14	36
Finland	19	61
Argentine Republic	10	41
South Africa	55	187
Italy	8	28
Total (1900)	7,300	15,300

D. O. Kellogg.

SALVIA or SAGE, an herb. See Horticulture, Vol. XII, pp. 259, 273.

SALVINI, Tommaso, an Italian tragedian; born in Milan, in 1830. His father, being a professor of literature, gave him an excellent education. He was at first connected with the royal theater at Naples, and afterward played for six years with another troupe in several Italian theaters. For some time he played with Madame Ristori. His greatest success was at Florence, in 1865, on the 600th anniversary of Dante's birth, when he played the part of "Lancelotto" in the tragedy *Francesca di Rimini*, Madame Ristori playing "Francesca." Salvini played his rôle with such astonishing force as to attract marked attention to himself. The grateful city of Florence presented him with a statuette of Dante. In 1875 Salvini visited the United States, and again in 1881. His chief parts were Othello, Hamlet, Saul, and Orosmanes. His personation of Othello especially was received with great enthusiasm. The elements of his success are his splendid physique, noble bearing, perfect elocution, dramatic power and vehement passion. When in 1868 he performed at Madrid in *La Morte Civile*, the audience, carried away with the intense realism of the death he enacted before them, rushed upon the stage to see if the actor was yet alive. Salvini's last appearance in England was in 1884. He received the honor of knighthood from King Victor Emmanuel.—His son, Alexander Salvini, followed in his father's footsteps, and obtained measurable success in the *Three Guardsmen*, and other plays. He starred in the United States. He died Dec. 15, 1896.



TOMMASO SALVINI.

SAMANA BAY. See Hayti, XI, p. 485

SAMARIUM, a new element found in samarskite, the molecular weight of whose oxide is less than 117. It was first discovered by M. Delafontaine in 1878, but not verified until by M. Lecoq in 1881. It is regarded identical with the β β described by Marignac.

SAMBRE, a river of France and Belgium, the principal affluent of the Meuse; navigable for barges the greater part of its course; rises in the French department Aisne; flows northeasterly between the valleys of the Scheldt and Oise, through the Belgian provinces of Hainault and Namur, and in the latter province joins the Meuse after pursuing a total course of 100 miles. The Sambre is connected by canals with the Senne and Scheldt in Belgium, and with the Oise in France; its basin produces large quantities of coal.

SAMOA. For general article on this group of 14 volcanic islands in the South Pacific, see NAVIGATORS' ISLANDS, Vol. XVII p. 287. The total area of the group is about 1,700 square miles; population 1874, 34,265, 16,568 being in Upolu, 12,530 in Savaii, and 3,806 in Tutuila. Savaii and Upolu belong to Germany, and Tutuila, with its fine harbor, to the United States. Population 1897, 36,565. The natives are Polynesians, and there are about three hundred whites. Chief exports are cocoanuts, sugar, copra, cotton and coffee. The commerce of the German islands was in 1902 about $100,000; the German seat of government is Apia. The total imports of the islands in 1900 amounted to $524,000, the exports to $443,000.

At a Samoan conference at Berlin in 1889, of representatives of Great Britain, Germany and the United States, an act was signed (June 14th) guaranteeing the neutrality of the islands, in which the citizens of the three signatory powers have equal rights of residence, trade and personal protection. The three powers recognize the independence of the Samoan government and the right of the natives to elect their chief or king, and to choose their own form of government. A court is established, consisting of one judge, who shall be styled chief justice of Samoa. This court has jurisdiction in (1) all civil suits concerning real property; (2) all civil suits between natives and foreigners or between foreigners of different nationalities; (3) all crimes and offenses committed by natives against foreigners, or committed by such foreigners as are not subject to any consular jurisdiction.

All future alienation of lands is prohibited, with certain specified exceptions. The land commission under the treaty found the claims of foreigners amounted to more than 700,000 acres more than the island contained. In 1894 it allowed German claims to the extent of 75,000 acres, British 36,000, and American 21,000. Revenues arise from customs and taxes, paid chiefly by foreigners, no attempt being made to collect the small capitation-tax from natives. A local administration is provided for the municipal district of Apia.

As a result of the conference, the United States Congress appropriated $100,000 to establish a coaling station at the port of Pago-Pago, and a half million dollars to enable this country to carry out its treaty obligations with Samoa and to uphold and protect American rights in those islands. The American system of money was adopted, but English money is commonly used.

In consequence of the native troubles and the international jealousies, several warships assembled at Apia early in 1889. The United States was represented by the *Vandalia*, *Nipsic*, and *Trenton;* Germany by the *Eber*, *Olga*, and *Adler;* and Great Britain by the *Calliope*. On the night of the 15th of March a hurricane arose that was almost unprecedented in its fury. A chain of coral reefs, having but one opening through which vessels can pass, makes, with a horseshoe-shaped indentation of the shore, the harbor of Apia. Within the enclosed space, about a mile in circumference, were anchored the seven warships mentioned, together with several schooners, a large iron merchant-vessel, and smaller coasting craft. Forewarned by the falling barometer, the ships made preparations to encounter the coming storm, extra anchors being carried out, top-hamper sent down, and steam gotten up. The storm was, however, of such severity that the ordinary resources of seamanship availed little. Anchors dragged despite the utmost efforts of the screws to hold the ships up to their moorings, collisions were frequent, and the scenes of wreck and death were appalling. The *Eber* first struck the reef on the western side of the bay and turned bottom up, seventy-one of her crew being drowned, while five were saved by the islanders, who throughout the storm exhibited great bravery, forming living chains to rescue those who were tossing in the giant surf. The *Nipsic*, after colliding with the *Eber*, sinking a schooner, and being rammed by the *Olga*, was skilfully beached, all her crew but seven being saved by the Samoans. The *Adler*, drifting broadside on to the reef, was suddenly lifted by a tremendous wave, and flung bodily on her side upon the rocks. Twenty out of her crew of 130 were drowned, the rest finding shelter on the vessel, which made a lee for the survivors to secure a hold until rescued. The *Vandalia*, after having been in collision with the *Calliope*, was beached, but her crew were gradually washed away till forty-four had been drowned, the rest being saved by the *Trenton*, which drifted down to the wreck. The *Olga* collided with nearly every other vessel in the harbor, but was ultimately beached without the loss of a man. The *Trenton*, the American flagship, lost her rudder, and was flooded through her hawse-holes, the fires being extinguished and the ship rendered helpless. She drifted around for over seven hours, at one time keeping from the reef by the expedient of sending the crew into the mizzen rigging, thus forming a human sail and wearing off. About noon on the 16th the *Calliope* slowly forged her way past the *Trenton* and through the opening in the reef out to sea. As she passed the American flagship within speaking distance, the crew of the latter gave the British ship a tremendous cheer,—a token of applause for skilful seamanship

and of an amity between the two navies that has been manifested on other occasions. The loss on board the *Trenton* was only one man, but she was so strained and wrecked that she was abandoned. The merchant-vessels in the harbor—some fifteen in number—were sunk or stranded. The *Olga* and *Nipsic* were afterwards floated; the *Calliope* escaped both loss of life and serious injury.

Cocoa plantations were begun in 1892. More than half of the ships that enter and clear at the port of Apia are British, but on the other hand the imports carried in German vessels are of greater value than those carried in British or American. There is now regular steam communication with San Francisco, Auckland, and Sydney.

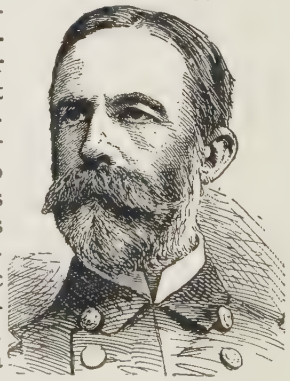
Sudden interest in this remote quarter of the globe has recently been excited by news of a renewed outbreak at Apia among the factions of the rival monarchs for the throne, incited by European intrigue. Robert Louis Stevenson's *Eight Years of Trouble in Samoa* tells us a little of the chronic disaffection among the Samoan tribes. The strife had its origin in the rivalry of two claimants for the Samoan crown, the partisans of both rejecting interference by the European residents and choosing Mataafa as their king. This native action was particularly resented by the German element on the chief island of the group, and to promote peace and security a tripartite treaty was negotiated April 19, 1890, under which government has since been maintained jointly by the United States, Germany, and Great Britain. The treaty prohibited the sale of arms and ammunition and the trade in liquor between foreigners and the natives. On Aug. 22, 1898, the ruling king, Malietoa, died, and the natives thrust Mataafa forward as his successor. For some reason, however, this potentate was deemed ineligible by the American chief justice, who, by the treaty, was empowered to decide questions of disputed succession, and Mataafa was supplanted by the deceased ruler's nephew, Malietoa Tanus. This deposition was naturally not agreeable to the natives, who clung to Mataafa, and were encouraged in their predilection by the German consul and his resident countrymen. In support of the native choice there was an ominous demonstration, and the American chief justice had to fly the scene, whereupon the German president of the Municipal Court of the international port of Apia usurped the post. To this action the British and American consuls objected, as being a violation of the treaty, and with the aid of a body of marines they regained possession of the court and expelled the German nominee and his adherents.

The career of Mataafa has been unusually checkered. He has been the trusted viceroy of an exiled king, then his avenger, defeating and driving out the usurper, Tamasese, who had been supported by German influence against the reigning Malietoa, and incidentally defeating and slaughtering a body of German marines who attempted his capture. Elected king by the principal chiefs, he proposed to surrender his position to the original sovereign, Malietoa, on his return from exile. The later, however, proposed to take the office of vice-king himself, leaving the popular chief to administer the native government. Germany refused to recognize Mataafa, so he withdrew to his own district of Malie, and there set up a local government, which, although conducted peaceably, ignored the arrangements made by the treaty Powers. The native kingship was afterwards abolished.

An adjustment of the international differences at length came about in 1899, as the result of the deliberations in Samoa of a commission appointed by the three interested Powers. The adjustment took the form of an amicable partition of the islands between Germany and the United States, England withdrawing, and receiving compensation from Germany for renouncing her own claims. The settlement, which took place Nov. 8, 1899, gave to Germany the two western Samoan islands, *viz.*, Savaii and Upolu, with its capital at Apia; while to the United States fell the island of Tutuila and the other adjacent members of the group. Great Britain was compensated by Germany ceding her the Tonga Islands, lying to the south of Samoa, including the Savage Island group, and also the islands of Choiseul and Isabelle, in the Solomon group. She also gained certain advantages in Africa. The Samoan treaty was signed at Washington, Dec. 2, 1899, by the representatives of the three interested Powers. Equality as to freedom of trade was reserved to all three nations in the islands.

SAMPSON, Ezra, an American clergyman; born in Middleborough, Mass., Feb. 12, 1749. He graduated at Yale College in 1773, and settled at Plympton, Mass., in 1775, in which year he became chaplain in the Revolutionary army. He settled at Hudson, N. Y., in 1797, and from 1801 to 1804 was one of the editors of the *Balance*, one of the first literary journals of the country. He was appointed judge of the Columbia Co. court (N. Y.) in 1814. Among his publications are *Beauties of the Bible* (1802); *Historical Directory* (1803); *The Sham Patriot Unmasked* (1803); *The Brief Remarker* (1820); etc. He died in New York, N. Y., Dec. 12, 1823. E.E.T.

SAMPSON, William Thomas, rear-admiral U.S. navy, was born near Palmyra, N. Y., Feb. 9, 1840. At the age of 17 he entered the U.S. Naval Academy at Annapolis, and four years later graduated first in his class. At the outbreak of the Civil War Sampson was old enough to obtain a command, and his first service in the navy was on board the frigate *Potomac*, of the South Atlantic squadron, where he remained one year as master. During his first year at sea his services were so acceptable to the superior officers that he was promoted second-lieutenant. While participating in the evolutions of the South Atlantic squadron he served on board the *John Adams* (1862–63), and the *Patapsco* (1864–65).



WILLIAM T. SAMPSON.

It was the fate of Lieutenant Sampson, then only twenty-five years of age, to be acting as executive officer on board the ironclad *Patapsco* of the blockading fleet before Charleston, S. C., when that vessel was blown up in Charleston harbor by a torpedo, and sank in fifteen seconds, on Jan. 15, 1865. In his report to the Secretary of the Navy, Commander Quackenbush said: "The cool intrepidity displayed by Lieutenant Sampson, my executive officer, deserves the highest praise." Sampson afterwards became known throughout the service for just such qualities as he displayed on board the *Patapsco*. In 1866, while serving on the *Colorado*, he was made lieutenant-commander. From 1868 to 1871 he was at the Naval Academy as instructor, and in 1872–73 he was cruising in Europe and elsewhere on the *Congress*. In 1874 he reached the grade of commander, in which capacity he served on the *Alert*, a third-rate vessel. Subsequently he was despatched to the Asiatic station in command of the *Swatara*. A turn of shore duty followed from 1876 to 1878 at the Naval Academy, and in 1882 he was stationed at the Naval Observatory, a position which he held till 1885. While stationed at the Naval Observatory he was sent as a delegate to the International Prime Meridian and Time Conference, held at Washington in 1884. He also acted as a member of the board on fortifications and other defences, which met at Washington in 1885. From 1886 to 1890 he was superintendent of the Naval Academy.

In March, 1889, Sampson attained the rank of captain, and in that year was delegate from the United States to the International Maritime Conference held at Washington. In 1890 he was ordered to the Pacific coast to take command of the new United States cruiser *San Francisco*, with which he remained till 1892. In Jan., 1893, he took charge of the Ordnance Bureau, ordnance matters and torpedo work having been for many years previously Captain Sampson's special duty. On June 15, 1897, he was appointed to the command of the *Iowa*, one of the most formidable of modern battleships. On Feb. 17, 1898, he was appointed president of the naval court of inquiry which investigated the cause of the explosion which destroyed the battleship *Maine*, and reported thereon March 21, 1898. On March 26 he was made acting rear-admiral, and was promoted to succeed Admiral Sicard as commander of the North Atlantic squadron, Rear-Admiral Sicard being retired from the command on account of ill-health. The North Atlantic squadron consisted of seventy of the principal ships of the United States navy, which had assembled off Key West in anticipation of war with Spain. The President, in thus authorizing Sampson to hoist the flag of a rear-admiral, practically made him the senior flag-officer of the entire fleet of the United States war vessels on the North Atlantic coast. Admiral Sampson thus suddenly became the most prominent man of the hour in the United States navy in the approaching struggle with Spain. On April 21 he was ordered to Cuba to blockade Havana; and when Cervera's Spanish squadron was known to be in western waters, Sampson proceeded to San Juan, Porto Rico, the forts of which he bombarded (May 12), so as to discover if the enemy's fleet were secreted in the harbor. Cervera had by this time taken refuge in the harbor of Santiago de Cuba, and there Sampson and his squadron, joined by Schley and his fleet, established a close blockade until Sunday, July 3, 1898, when Cervera and his ships sought to escape from the port by flight. This rash act had its disastrous sequel in the destruction of the whole of the Spanish squadron under Cervera's command. See CEVERA, Vol. XXVI, p. 101; UNITED STATES, Vol. XXIX, p. 390.

At the eventful moment of the attempted escape of the Spanish fleet from the harbor, Admiral Sampson was on the flag-ship *New York*, four miles east of her blockading station, and seven miles from the harbor. He was on his way to Siboney to consult with General Shafter, commander of the land forces in Cuba, in regard to the situation, as a more definite understanding between the proposed operations of the land and sea forces had been rendered necessary by the unexpectedly stubborn resistance of the Spanish garrison of Santiago. While he was thus absent, the Spanish squadron appeared in the channel to make a dash through the line of blockade. The commander of the second division, Commodore Schley, took up the chase and led the fleet to victory until the *New York*, with Admiral Sampson on board, came up, and the latter resumed command. The battle of Santiago speaks highly for the skill and care of Admiral Sampson in maintaining the efficiency of his fleet and in holding the officers and men under his charge in proper readiness for the work they were there to do. If the admiral cannot be called a showy and dashing officer, he undoubtedly possesses admirable qualifications for his important command. On the day of this battle, July 3, Sampson became commodore by the retirement of Rear-Admiral Kirkland; on Aug. 10 he was made rear-admiral; and on Aug. 16 was appointed one of the three commissioners to arrange the evacuation of Cuba. Later he resumed command of the fleet on the North Atlantic station.

The destruction of Cervera's fleet gave rise to some controversy as to the credit to be given for the victory, the friends of Commodore Schley urging his claims, while the friends of Admiral Sampson affirmed that the honor rested with him. Commodore Schley himself declared that "The victory was big enough for all." This reasonable verdict the nation as a whole applauded and shared. Admiral Sampson died May 7, 1902.

SAMSON, GEORGE WHITEFIELD, clergyman and educator; was born at Harvard, Massachusetts, on September 29, 1819, and was graduated from Brown University in 1839 and from Newton Theological Seminary in 1843. He served in the ministry of the Baptist Church until 1859, when he became the fifth president of Columbian University, Washington, D. C. He extended the scope of that institution by building and opening its law school in 1865, but in 1871 resigned the presidency and became the head of the Rutgers

Female College in New York city. That place he resigned in 1875, but resumed it in 1886. He wrote *The Spiritual Medium* (1852); *Physical Media in Spiritual Manifestations* (1868); *Outlines of the History of Ethics* (1860); *Elements of Art Criticism* (1867); *The Atonement* (1878); *Divine Law as to Wines* (1880); *English Revisers' Greek Text Shown to be Unauthorized* (1882); *Guide to Self-Education* (1886); *Guide to Bible Interpretation* (1887), and *Idols of Fashion and Culture* (1888). He died in August, 1896. W.F.J.

SAMSUN, Turkey in Asia, a seaport town in the vilayet of Trebizond on a deep bay indenting the southern shore of the Black Sea, 85 miles southeast of Sinope or Sinub with which it has steamer communication as also with neighboring ports, including Batum in Russian Caucasia. A wagon road extends into the interior beyond Amasia and Tokat to Sìvàs (q. v., Vol. XXII, p. 110), an important receiving and distributing center for Oriental and Occidental merchandise which passes through the port of Samsun. The inhabitants comprise Mohammedans, Greeks, and Armenians. Population, 12,000. C.L.S.

SAMUELSON, James, a British author; born in Hull, England, in 1829. He studied zoölogy in Königsberg University; was called to the bar in 1870, but never practiced; engaged in manufacturing enterprises, but left the management to his sons, and devoted most of his time to travel and writing; founded and was president of the Liverpool Science and Art Classes, and frequently acted as an intermediary in labor troubles, especially in the Dock Strikes of 1879. He wrote a scientific work, *Humble Creatures* (1860); *Roumania, Past and Present* (1882); *India, Past and Present* (1889); the social works, *The German Workingman* (1869) and *The History of Drink* (1879). He was editor of a quarterly review called *Subjects of the Days.*

SAMURAI. See Japan, Vol. XIII, pp. 589, 593.

SAN ANGELO, a town and the capital of Tom Green County, southwestern central Texas, on the Concha River and on the Gulf, Colorado and Santa Fé railroad, about 180 miles W.N.W. of Austin. The chief industries are ice-manufacturing and flour-milling. The surrounding country is devoted to the raising of cattle, sheep and horses; fruit is abundantly produced, and good building-stone is plentiful. Population 1890, 2,615; 1900, 2,700.

SAN ANTONIO, Texas. In 1890 San Antonio was the center for four railroads, the International and Great Northern, San Antonio and Aransas Pass, San Antonio and Gulf Shore and the Southern Pacific. In the line of manufactures it has cars and general shop construction works, foundries and machine-shops, factories for the production of doors, sash, blinds, cigars and tobacco, printing and publishing houses, and saddlery and harness shops, etc., all of which are in active operation, numbering, in 1900, 312 establishments, with an aggregate capital of $4,252,197. It has a system of water-works, many miles of paved streets, electric lights and a well equipped electric-railway service. Besides a fine system of public schools, there are a number of institutions under personal and denominational control. The notable buildings are a county courthouse costing nearly $1,000,000, a United States government building, several hospitals, and halls belonging to secret societies. The surrounding region is devoted to agriculture and grazing, and does a large business in cotton, wool, hides and live-stock. Population 1890, 37,673; 1900, 53,321.

Fort Sam Houston, a United States military post in the Department of Texas, is situated two miles N. of San Antonio, which is the post-office, telegraph and railroad station for the post. The fort is in a reservation covering 469.23 acres, and has accommodations for 34 officers, 3 troops of cavalry, 8 companies of infantry and one light battery. In 1895 it was garrisoned by two troops of cavalry, eight companies of infantry and a battery of artillery. For general article, see San Antonio, Vol. XXI, p. 267.

SAN ANTONIO RIVER, a stream formed by the union of Medina River and Leon Creek, in Bexar County, southeastern central Texas. After flowing southeasterly for about 175 miles, through the counties of Wilson, Karnes and Goliad, it enters the Gulf of Mexico, 130 miles S.W. of Galveston, by way of Espiritu Santo Bay.

SAN BERNARDINO, California, the seat of the southeastern county of the same name, a city at the foot of the northwestern slopes of the San Bernardino ridge of the Coast Range, and a junction of three branches of the Southern California and two divisions of the Southern Pacific Company railroads, 60 miles east of Los Angeles. The equable climate and the splendid neighboring mountain scenery make San Bernardino a frequented summer and winter health resort. It exports the products of a large metalliferous, farming, and fruit-raising region, and has large railroad workshops. Population, 1890, 4,012; 1900, 6,150. C.L.S.

SAN BLAS, Mexico, a seaport town on the Pacific Ocean in the territory of Tepic and the state of Jalisco, about 150 miles south of Mazatlan and the same distance west by north of Guadalajara, the state capital. The estuary of the Santiago River and a land locked bay afford a safe harbor for small coasting vessels, larger vessels anchoring in the outer roadstead to which the islands of Las Tres Marias form a natural breakwater. A small railway penetrates the interior to Huaristembe. Silver from the mountain mines is the most valuable article of export. Population, 5,000. C.L.S.

SAN BLAS, Cape, the extreme southern point of Calhoun County, northwestern Florida, about 125 miles S.E. of Pensacola, in lat. 29° 39′ 46″ N., and long. 85° 21′ 38″ W. It has a revolving light 98 feet in height.

SAN BLAS, Gulf or Bay of, a bay on the northern side of the Isthmus of Panama, in long. 79° W., where the isthmus has its narrowest point, being but 31 miles wide here, and takes the

name of San Blas. This neck of land has at times been suggested as a route for an inter-oceanic ship-canal, but surveys have shown the project to be impracticable, owing to the high mountains which would have to be crossed.

SAN BONIFACIO DE IBAGUÉ, a town and the capital of the department of Tolima, western central Colombia, 90 miles W. of Bogotá, on western affluents of the Magdalena River, on a plateau having an elevation of 4,300 feet. It has a healthful climate and is the center of a district producing tropical and semi-tropical fruits. There are, in the vicinity, warm springs, sulphur-deposits and silver-mines. The port of the town is Guataquisito, on the Magdalena River, to which a railroad is projected. Population about 13,000.

SANBORN, Franklin Benjamin, an American journalist; born in Hampton Falls, N. H., Dec. 15, 1831. He graduated at Harvard in 1855; has been a lecturer at Cornell University, at Smith and Wellesley colleges, and at the Concord School of Philosophy. He has been editor of the Boston *Commonwealth*, the *Springfield Republican*, and the *Journal of Social Science*, 1876–97. He was one of the founders of the American Social Science Association, and has written several biographical works and *A History of New Hampshire*, and has edited several State reports on charities, labor, etc. E.E.T.

SAN BUENAVENTURA, a city and the capital of Ventura County, Southern California, on the Pacific Ocean, and on the Southern Pacific railroad, about 60 miles W.N.W. of Los Angeles. It was the seat of an old Spanish mission, from which it derives its legal name, its post-office designation being Ventura. It is the center of a district engaged in agriculture and fruit-growing; has a fine harbor, and possesses hot springs, which, with the healthful climate, have made the place a popular resort for invalids. Population 1890, 3,869; 1900, 2,470.

SAN CARLOS or BARINAS, a town of Zamora, Venezuela, 120 miles W.S.W. of Caracas, near the Santo Domingo River. The town, which has been twice devastated, was founded in the sixteenth century, and is now noted for its large shipments of tobacco. Population, about 4,000.

SANCTIFICATION. See Paul, Vol. XVIII, p. 436.

SAND. See Geology, Vol. X, pp. 216, 217.

SAND, George. See Dudevant, Mme., Vol. VII, pp. 438–441.

SAND-BLAST. See Vol. XXI, p. 269.

SANDELWORT, a member of the sandalwood family. See Sandalwood, Vol. XXI, 268, 269.

SANDEMAN, Robert, and SANDEMANIANS. See Glas, John, Vol. X, pp. 567–568.

SANDERLING, a bird. See Sandpiper, Vol. XXI, p. 273.

SANDERS or RED SANDERSWOOD. See Sandalwood, Vol. XXI, p. 269.

SANDERS, Nicholas (1527–79), an English Roman Catholic clergyman; an Oxford graduate; religious refugee in Rome; papal nuncio at Madrid; organized an invasion of Ireland; author of a Latin treatise on the Anglican schism. See Ireland, Vol. XIII, p. 270.

SANDERSON, John, author and educator; was born near Carlisle, Pennsylvania, in 1783, and at first studied for the bar, but eventually became a teacher and author. He was for some years professor of Latin and Greek in the Philadelphia High School, and it was through his efforts that those languages were retained at Girard College. He contributed to the *Knickerbocker Magazine*, and wrote two volumes of biographies of the signers of the Declaration of Independence; a *Defence of Classical Literature as a Branch of Study in Girard College*, and *Sketches of Paris*. He died on April 5, 1844. W.F.J.

SANDERSON, Sir Percy, diplomat; was born in London on July 7, 1842, entered the Indian army and served with distinction until 1870. He then entered the consular service, and was stationed in Roumania for some years. From 1881 to 1886 he was *chargé d'affaires* at Bucharest. In 1882 he was a commissioner for the navigation of the Danube, and was on special service at the Danube Conference of 1883. He was knighted in 1899, and since 1894 has been British consul-general in New York. W.F.J.

SANDERSON, Sybil, famous American opera singer, born in Sacramento, Cal., 1869, died in Paris, May 16, 1903. She made her debut at The Hague in 1888 and had a highly successful career in Germany, France and the United States. In 1897, she married Antonio Terry, the Cuban millionaire.

SANDERSVILLE, a city and the capital of Washington County, eastern central Georgia, on the Augusta Southern and the Sandersville railroads, about 70 miles S.W. of Augusta and 64 miles N.N.E. of Macon. It is situated in a fertile district devoted to farming and the raising of cotton, the shipping-trade in the latter product being quite considerable. Population 1890, 1,760; 1900, 2,023.

SAND-FLIES or SIMULIUM. See Mosquito, Vol. XVI, p. 894.

SANDHOPPER or ORCHESTIA. See Crustacea, Vol. VI, p. 585.

SANDHURST. See Army, Vol. II, p. 512.

SAN DIEGO, California, the seat of a county of the same name, a seaport and city on a beautiful landlocked bay of the Pacific Ocean, 18 miles north of the Mexican boundary, 500 miles southeast of San Francisco and entered by six lines of railroad. The crescent shaped bay, 5 miles long and 1 mile wide, is, next to San Francisco, the best harbor in California. Its entrance is marked by Point Loma, a steep bluff 300 feet high, forming the extremity of a mesa-like plateau rising to a maximum height of 450 feet, and extending southward for six or seven miles. Point Loma dominates the low, slender peninsula and summer colony of Coronado Beach, with its enormous hotel, which a steam ferry across the bay connects with the town built along the shore and on the slopes that rise from the water. The bay discovered by Cabrillo in 1542 was surveyed and named by Sebastian Viscaino, in 1603; in 1769, two expeditions under Spanish religious auspices,

arrived here, and established the mission of San Diego, under the direction of Father Junipero Serra. Besides being one of the most frequented health and pleasure resorts on the Pacific coast, on account of its ocean climate, suburban and historic attractions, San Diego is the trade center of a large citrus-fruit, vine-growing, and honey-producing region. Its manufacturing interests include dried and salt fisheries, breweries, wine, ice and soap factories, iron and machine works, lumber and brick yards. Steamers connect with San Francisco and all important Pacific coast ports, and a periodical trans-oceanic line communicates with China, Japan, and Hawaii. Population, 1890, 16,159; 1900, 17,700. C.L.S.

SAN DIEGO, a town and the capital of Duval County, southeastern Texas, on the Mexican National railroad, about 55 miles W. of Corpus Christi. The staple products of the county are cattle and horses. The inhabitants are mostly Mexicans. Population about 900.

SAND-LANCE OR SAND-LAUNCE. See SAND-EEL, Vol. XXI, p. 270.

SANDS, BENJAMIN FRANKLIN, an American naval officer; born in Baltimore, Md., Feb. 11, 1811. He entered the navy in 1828 and rose to rear-admiral in 1871. He was engaged in the suppression of the slave trade, 1848–50; served with the North Atlantic squadron in the Civil war, being senior officer at the blockade of Wilmington, commanding the division that blockaded the Texan coast, and taking Galveston. He was superintendent of the naval observatory at Washington, 1867–73; was retired, Feb., 1874. He died in Washington, D. C., June 30, 1883. E.E.T.

SAND-STAR OR OPHIURIDEA. See ECHINODERMATA, Vol. VII, pp. 544, 550.

SANDSTONE. See GEOLOGY, Vol. X, 212.

SANDUSKY, a city and the capital of Erie County, Ohio. Population 1890, 18,471; 1900, 19,664. See also SANDUSKY, Vol. XXI, p. 273.

SAND-WASP. See HYMENOPTERA, Vol. XII, p. 607.

SANDWICH, a manufacturing town of Dekalb County, northern Illinois, on the Chicago, Burlington and Quincy railroad, 18 miles W.S.W. of Aurora and 57 miles in the same direction from Chicago. It produces cheese, flour, windmills and agricultural machinery. Population, 1900, 2,520.

SANDWICH, Massachusetts, a seaport town of Barnstable County, on Sandwich Harbor, a southwestern inlet of Cape Cod Bay, and on a division of the New York, New Haven & Hartford railroad, 62 miles southeast of Boston. It occupies the site of the Indian Shawme and is a favorite summer resort, affording fine fishing. In an agricultural section producing special crops of cranberries, it also has glass and lamp making industries and manufactures silk braids, jewelry, etc. Population, 1890, 1,819; 1900, 1,448. C.L.S.

SANDWICH, a post village and the capital of Essex County, southwestern Ontario, Canada, on the Detroit River, nearly opposite Detroit, and about two miles S.W. of Windsor. It is one of the oldest settlements in this part of Canada. Colonization is said to have begun in 1700, when the place was known as Pointe de Montréal. A house of the Basilian Monks, and Assumption College, a Roman Catholic institution, are located here. The existence of mineral springs makes it a resort for invalids. It has a brewery and several mills. Population, 1891, 1,352; 1901, 1,450.

SANDWICH ISLES. See HAWAIIAN ISLANDS, Vol. XI, pp. 471–476; and in these Supplements.

SANDY HILL, New York, a village of Washington County, 53 miles north of Albany on the Delaware & Hudson railroad and canal, and on the east bank of the Hudson River at a bend where Baker's Falls 50 feet high and the rapids above, furnish power to paper and other mills. Population, 1900, 4,473. C.L.S.

SANDY HOOK, New Jersey, a narrow sandy strip of land projecting from the northeastern point of Monmouth County, and with its lighthouse a prominent landmark at the western entrance to the Lower Bay, 18 miles south of New York city. From half a mile to a mile wide, the low lying peninsula extends five miles north from Old Shrewsbury Inlet and the southern point of the Navesink Highlands, and is traversed by the Long Branch & Sea Shore railroad, connecting various summer resorts and the government ordnance testing grounds. C.L.S.

SANDYS, JOHN EDWIN, classical scholar; was born in England on May 19, 1844, and was educated at St. John's, Cambridge, where he was one of the most brilliant scholars. He has written and edited many works on the classics, including Demosthenes, Aristotle, Euripides and Cicero, a *History of Classical Scholarship*, and a *Dictionary of Classical Mythology, Religion, Literature, Art and Antiquities*. He has received honorary degrees from Cambridge and Dublin universities. W.F.J.

SANDYS, SIR EDWIN, an English scholar and statesman; born about 1561. He was educated at Corpus Christi College, Oxford, under the learned Dr. Hooker. He then went on his travels and published the results of his observations in quarto, under the title of *Europæ Speculum*. He was knighted by James I, who employed him in many important missions. He left £1,500 to the University of Oxford for the endowment of a metaphysical lectureship. He died in 1629. E.E.T.

SAN FELIPE DE ACONCAGUA. See ACONCAGUA, Vol. I, p. 92.

SAN FILIPPO D'ARGIRÒ, a town of southeastern Sicily, in the province of Catania, situated on the right bank of the Traina. A considerable quantity of saffron is grown in the vicinity. Population, 7,500.

SANFORD, Florida, a city and winter resort of Orange County, 125 miles south of Jacksonville, entered by six lines of railroads. On the St. Johns River at the expansion of Lake Monroe it also has steamboat connections with various river ports, and is the shipping center for a large

farming district in which great attention is devoted to lettuce, celery and fruit for northern markets. It has railway repair shops, fruit-preserving, and cigar factories. Sanford was settled in 1870. Population, 1890, 2,016; 1900, 1,450. C.L.S.

SAN FRANCISCO, a city of western California. (For general article, see SAN FRANCISCO, Vol. XXI, pp. 274–277.) Among the notable buildings erected

CITY HALL, SAN FRANCISCO.

since 1880, in San Francisco are the New City Hall, the Crocker Building, the Chronicle Building, Academy of Sciences; Pioneer Hall, the Lick Public Baths and the Mills Building. The city is lighted by gas and electricity, and local transit is carried on by cable and electric street-railways. In 1890 there were 135 churches, divided among almost all the leading denominations. Some of the well-known church edifices include St. Mary's Cathedral (Roman Catholic), Grace Church (Protestant Episcopal), Trinity Cathedral (Protestant Episcopal), Sherith Israel Synagogue, and Calvary Presbyterian and the First Unitarian churches. The Chinese, also, had six large joss-houses. According to the school census of 1893 the number of children of school age (5 to 17 years) was 68,390, of which 44,349 were enrolled in public schools, and 8,973 in private or parochial schools. The value of public school property was estimated at $5,063,363, and expenditures of the year were $989,009. There are also numerous institutions for higher education and technical and professional training, some of the more important of those recently established being the Hastings College of Law, the Dental Department of the University of California, also the medical and pharmaceutical departments of the same university, a training-school for nurses, and an industrial school. The Mechanics Institute, the Academy of Sciences and the Lick Mechanical Art School are all devoted to technical education. Among the numerous libraries are the Bancroft, having 45,000 volumes; the Bibliothèque de la Ligne Nationale Française, 13,000; the Free Public, 69,000; the Mechanics Institute, 57,900; the Mercantile Library Association, 62,000; the Odd Fellows, 42,500; the St. Ignatius College, 30,000; the San Francisco Law, 31,000; the Sutro, 200,000. These are the figures as reported in 1893. In 1895 there were published, in the city, 15 daily, 81 weekly, and numerous semiweekly, semimonthly, monthly and quarterly periodicals.

San Francisco's unexcelled transportation facilities, by both land and water, make it one of the most important commercial centers in America. Its railroads, the California and Nevada, the San Francisco and North Pacific, and the Southern Pacific, give it communication with all parts of the country, while vessels leave its port for all parts of the world. For the year ending June 30, 1890, the total imports of merchandise were $48,751,223; of treasure, consisting of gold and silver bullion and coin, $8,020,849; exports of merchandise, foreign and domestic, $36,876,091; of gold and silver bullion and coin, $5,710,564; 810 vessels, of 1,030,538 tons, entered, and 826 vessels, of 1,080,974 tons, cleared, the port The receipts at the custom-house were nearly $8,000,000, and the immigrants landed, including 1,716 Chinese, numbered 3,606.

In the returns for 1900 there were reported 4,002 establishments, employing $80,103,367 in capital, paying $22,037,527 in wages to 41,978 persons, and $79,492,952 for materials, from which were turned out products valued at $133,069,416. According to capital employed, the principal industries were refining of sugar and molasses, breweries, manufactures of men's clothing, foundries and machine-shops, coffee and spices, boots and shoes, flour and grist mills, leather, canning of fruits and vegetables, printing and publishing, saddlery and harness, ship-building, slaughtering, cigars and tobacco.

The assessment roll of personal property in 1890 showed a value of $66,243,938. The debt of the municipality is $1,800,000. The rate of taxation is less than that of any large city in the country, the city officers being pledged to keep it within $1 on every $100 of valuation. There are 15 incorporated commercial or discount banks, with an aggregate paid-up capital of $37,000,000. Three private banks add $1,260,000 to this amount. The annual transactions of these 18 institutions, as represented by the clearing-house statements, are nearly $844,000,000. There are 12 savings banks, with a total of deposits, in round numbers, of $87,000,000.

The population, which, in 1880, was 233,959, had increased, in 1890, to 298,997, of whom 127,000 were foreign-born. Population 1900, 342,782.

SAN FRANCISCO MOUNTAINS, Arizona, an isolated ridge in Coconino County, rising 5,000 feet above the Great Colorado Plateau, and attaining a maximum altitude of 12,794 feet above ocean level. It is reached from Flagstaff the county seat, 10 miles to the south, on the Atchison, Topeka & Santa Fé Pacific railroad; the principal points are Mesa Butte, Kendrick, Humphrey, O'Leary, Agassiz and Sunset peaks. The ridge is a volcanic uplift covered to a height of 11,468 feet with pine trees. C.L.S.

SANGA. See GALLA OX, in these Supplements.

SANGHA OR SAMGHA. See BUDDHISM, Vol. IV, pp. 389–390.

SANGIR OR SANGI ISLANDS, Dutch East Indies, a chain of small islands with an aggregate

area of 350 square miles, extending between the southern point of Mindanao Island in the Philippines and the northeastern end of Celebes. The chain marks the eastern boundary of the Celebes Sea, and is named after the largest island, Great Sangir, which is 30 miles long and has a maximum breadth of 10 miles; it is mountainous, rising in the center to the active volcanic peak of Abu; Taruna on the northwest coast is the chief settlement. Valuable cabinet woods, rice, cocoa and trepang are exported. Pop. (estimated), 50,000. C.L.S.

SANGKOI OR SONGKOI. See TONG KING, Vol. XXIII, pp. 467, 468.

SANGREAL, SANGRAAL OR HOLY GRAIL. See GRAÏL, Vol. XI, pp. 31–33.

SANGSTER, MARGARET ELIZABETH MUNSON, an American journalist; born in New Rochelle, New York, Feb. 22, 1838. She wrote for *Hearth and Home* (1871–73); *Christian at Work* (1873–79); *Harper's Young People* (1882); became editor of *Harper's Bazar* in 1889. She published *Poems of the Household* (1883); *Home Fairies and Heart Flowers* (1887); *Hours for Girls; Splendid Times;* and *On the Road Home* (1894).

SANGUINARIA. See BLOODROOT, in these Supplements.

SANHEDRIM. See SYNEDRIUM, Vol. XXII, p. 851.

SANITARY COMMISSION. At the outbreak of the Civil War the Army Medical Bureau found itself face to face with a task with which it was unable to cope, especially as legislation was lagging far behind the sudden growth of the army. Local organizations had sprung up everywhere, devoted to the welfare and comfort of the army, and it was through an endeavor to systematize these that the Sanitary Commission arose. Drs. Henry W. Bellows, Van Buren, Harsen and Harris held a conference with the government and urged the necessity of doing something to lessen the peril arising from bad sanitary condition. Finally, the Medical Bureau consented to the formation of a non-official association for such work, and on the 9th of June, 1869, the Secretary of War authorized Rev. Dr. Bellows, Prof. A. D. Boche, Walcott Gibbs, Drs. Jefries Wyman, W. H. Van Buren and S. I. Howe, and three army officers, A. E. Shiras, G. W. Cullum and Dr. R. C. Wood, to act as such a board, and associate others with them at their discretion. Thus the Commission escaped officialism, and was able to throw itself upon the sympathies of the public. However, the Commission was in fact merely an advisory board which acted through the Medical Board, an institution hindered by obsolete traditions and regulations. But, early in 1862, measures were taken by Congress to secure a greater freedom of action for the Commission. In order to facilitate research and the distribution of stores in emergencies, a system of inspectors was appointed, to whom were given such duties as required contact with those in authority and the direction of operations in the camps. They were usually men of wide medical learning, were pledged for a certain time, and were subject to such drill and regulations regarding promotion as the service would allow. Dr. Henry G. Clark, with a corps of sixty of these inspectors, undertook to investigate the hospitals, with a view to gathering information which would lead to their improvement. Out of this grew the American pavilion hospitals adopted by the government.

At first the facilities for transportation of stores was limited, as the medical department was dependent upon the quartermaster for these. But the commission fitted out trains of horses and wagons, chartered and fitted up steamboats, at the expense of the government, and constructed hospital-cars for the care and transportation of sick and wounded soldiers.

They were constantly on the watch to prevent the introduction or development of disease. Their influence with the regimental surgeons was great in bringing about the proper selection of camp sites, proper cooking, drainage and cleanliness. But their chief services in this capacity was the securing of proper food when the army was assailed by scurvy, smallpox, yellow fever, or other diseases. They even went so far as to start several immense truck-gardens for supplying vegetables to the army, while all luxuries, like ices, wines, etc., for the sick, passed through their hands.

Thousands of men were constantly passing to their regiments at the front, or being dismissed, were going home, or were being moved from one point to another. In the early part of the war especially there was much confusion, owing to general ignorance of rules and incompetent officers. In many cases these men encountered difficulties in securing their pay or papers, were in ill health, or beset by swindlers. The Commission did what it could to help these men, gave them food, furnished information, and even acted as their attorneys in securing pay or papers, and secured the acquittal of many who were wrongfully accused of desertion. As many as forty homes or resting-places were established for this purpose, near depots of transportation and centers of distribution. This branch of the service afterward developed into the Pension and War Claim Bureau.

For regular soldiers two forms of aid were provided,—one known as "general relief," which concerned hospitals, the other being known as "battlefield relief." Besides the inspectors, scores of assistants and relief agents, some of whom were women, and all educated and competent persons, were attached to each column. They looked after all matters of sending wounded to the rear, attended their injuries and provided for their proper transfer to the permanent hospitals. One of the noteworthy institutions established by this Commission was the Soldiers' Directory, in which over six hundred thousand names appeared. All latest information was added, so that questions regarding any of the men whose names were in the directory could be answered correctly.

The Sanitary Commission, by reason of its non-official nature, appealed to the citizens, and it gradually became "the vehicle of a nation's bounty." It was the medium through which women could make sacrifices for their imperiled country, many going

to the front as nurses or even attendants on battle-fields, while others worked at home, preparing with loving hands the comforts for the men suffering at the front.

It has been estimated that $15,000,000 worth of supplies was received by the Commission, while $4,962,014 was poured into its treasury. In the early part of the war, before it had gained a reputation, supplies came slowly, but at the latter end they poured in from all directions. Fairs were carried on in different cities for its benefit, which netted nearly $3,000,000, while $745,000 were sent by foreign countries. While the commissioners served without pay, it became necessary to furnish regular salaries to officers and agents, in order to avoid an irregular and constantly changing service. The original board appointed by the Secretary of War, together with their associates, numbered 14, with headquarters in Washington. This board created a standing committee, with headquarters in New York, which remained in daily session till the end of the war. It consisted of Dr. Bellows, Drs. Van Buren and Agnew, Professor Gibbs, G. T. Strong and Charles J. Stillé, who later became its authorized historian. The executive duties of the board fell upon F. L. Olmsted and John S. Newberry; the former, who was succeeded by Dr. Jenkins, was secretary of the board and the latter secretary of the western division. The commission established a Bureau of Vital Statistics, whose reports were extremely valuable and have done much to reorganize the medical service of both army and navy.

SANITARY CONVENIENCES OF MODERN HOUSES. The increased use of indoor closets, sinks, basins, etc., in many-storied buildings makes the matter of arrangement of these sanitary conveniences one of material interest, as affecting the health of all the occupants. The most marked change in connection with this work, within recent years, has been in the direction of placing the plumbing connections in more accessible locations. Formerly, it was considered desirable to place all the plumbing out of sight, within floors and petitions, or in dark closets, under stairways, or in out-of-the-way corners. They were considered unsightly. Now the best practice is to use exposed plumbing, as much as a due regard for appearances will permit, and the pipes are often gilded and made otherwise ornamental. The reason of the change is based on common sense. The drainage, soil and waste pipes of a building carry foul matter and give out bad air wherever there is a leak. If hid away, leaks are not discovered readily, and malaria and fevers spring out as the first indication that repairs are needed to the pipes. With plumbing arranged for easy inspection, leaks are apt to be noticed and promptly repaired, preventing the ills that follow in their train.

Cast-iron pipe is commonly used for drain and soil pipe in the United States, while lead pipe is frequently preferred in Great Britain, the claim being made that it is smoother and allows a freer flow. American drain-pipe, however, is amply smooth, and entirely satisfactory. Trouble will arise with any kind of pipe if there is not sufficient fall allowed to give enough speed to the fluid to render the pipes self-cleansing. Four-inch pipe should have a flow of at least four feet a second, and six to nine inch pipe should be given a flow at the rate of three feet a second.

A lavatory, or wash-basin, is often an annoyance, from the choking up of the valve with soap and accumulated dirt. Some sort of a screen has to be placed over the outlet, and the ordinary flowing out of the water is hardly sufficient to keep it clean. A recent device for overcoming the difficulty is a flushing-rim, which drives the water around circularly with considerable force and rinses the basin. Another good form of lavatory has a push-down piece, which raises the valve completely, allowing free flow into the outlet. This basin is made in one piece, of glazed earthenware, so that it is easily cleaned and kept in condition. It is provided with brass cylinder traps, having unions all ground to accurate fits. Kitchen sinks are troublesome to the plumber, as it is from them that the most grease and refuse usually gets into the pipes. Some of them are supplied with special grease-traps, but unless these are cleaned at regular intervals they become a foul nuisance. One of the best sinks is made of copper, with nickel-plated waste and overflow, and so recessed at the waste that the kitchen-maid can readily scrape up the grease as it accumulates there, without allowing it to go down the pipes. When the pipes become heavily coated with grease they retain various food-scraps, which rot and give off unwholesome odors. In such a case, hot water and ammonia should be poured down in liberal quantities to cut out the grease. It is best to connect kitchen sinks with the nearest soil-pipe, because the natural animal ammonia in the latter is usually sufficient to carry off all grease beyond that point.

Bath-tubs are made of galvanized sheet-iron, with a wood body; of zinc or copper, tinned or nickel-plated; of cast iron, with porcelain enamel; and of indurated fiber enameled. Porcelain tubs are preferred for hospital use, being non-absorbent, but copper is most commonly used for dwellings. In the more recent patterns, the tubs are not inclosed with wood, but stand on four metal feet, with exposed piping. Some are made independent of the heating-appliances in the house, having a set of tubes at the end, below which are placed gas-burners for heating the water and causing it to circulate.

Laundry tubs are made of soapstone, cement stone, galvanized iron, etc. White crockery or ceramic ware is considered the best and most expensive material for this use. Slop-sinks and slop-hoppers are well enough made of any of the common materials, but they should be regularly flushed and cleaned with soap and hot water,—a rule which is too frequently honored in the breach. There are few conveniences on the market for keeping them wholesome.

So much attention has been given to water-closet construction that almost all the bad and unscientific devices have been driven out, and the common form of bowls, cisterns and traps are entirely requisite for the purpose, if kept in order. Traps are made in innumerable forms. They are best made to com-

bine both a mechanical and a water seal, or with a double seal, as in the siphon closet. Here the lower part of the bowl becomes a water-seal and the trap below contains another. When a flood of water is supplied from the cistern, the upper water forces the air in the space between the traps through the water of the lower trap, thus establishing a siphoning action which assists in drawing off the contents of the bowl. It is very common to unite the crockery bowl of the closet with the floor, by allowing the lower end of the trap to project into the pipe, or by means of flush-connections. Both methods are bad. While the former cannot leak water, it is very apt to leak sewer-gas. The best method, now coming into use, is to allow the end of the soil-pipe to project above the floor and into the trap. Then if the joint ever leaks it will be water that comes out, and the leak will be detected at once, and can be repaired.

The chain-pull cistern for closets commands the market, though for public places the seat-depression flow is often preferred, or the automatic flushing at regular intervals. The ordinary cistern has a float-valve, which closes the inflow-hole in the water-pipe as soon as the cistern is full. It is not considered safe to flush direct from the water-supply pipes, as there may be occasional low head in the pipes, allowing foul air to get in and contaminate the drinking-water. The automatic flushing is performed by a gravity apparatus, in which there is a bowl supplied with a small stream of water. If it is set to flush every half-minute, at the end of that time the water in the bowl gives it sufficient weight to overturn, throwing its contents down the pipe for a flush. At the same time a similar bowl, mounted opposite to the one overturned, takes its place under the stream of water until it is filled, and, overturning, brings the first bowl into place again. Good ventilation should always be provided for closets. If they cannot have outer windows, then an air-shaft should be placed contiguous to them. Where the climate admits, they are best placed beyond the outer walls of the house. Basement closets are objectionable, as all accidents in the way of leaking sewer-gas contaminate the whole house, and because they are most liable to get out of order, and remain so for want of inspection by competent persons, they being usually left wholly to the care of domestics.

The ventilation of dwellings is much neglected. It is usually supposed that the chimney-flues and the windows will afford all the air required. Fresh air without draft is what should be provided, and what not one dwelling in a hundred is designed to furnish its occupants. A perforated panel below a window, with numerous minute holes, is a good method of admitting air without noticeable draft. A hole in the chimney-flue, with a shutter to cut off any down-blow of smoke, is another simple device more commonly employed. Chowne's siphon ventilating system is used by some architects, especially in large buildings, where these matters receive more attention. It is based on the principle that an upright J-shaped tube always gives the air a tendency to rise in the longer leg, and to fall in the shorter leg. By making use of some ornament for the short tube, and utilizing flues for the long tube, convenient ventilation may be obtained without any visible appliances.

C. H. Cochrane.

SAN JACINTO, Battle of. See Houston, Vol. XII, p. 318.

SAN JOAQUIN RIVER and VALLEY. See California, Vol. IV, pp. 618, 619; and Stockton, Vol. XXII, p. 589.

SAN JOSÉ, the capital of Santa Clara County, California, on several branches of the Southern Pacific railroad. The city is noted for its rapid growth, delightful climate and charming surroundings, made up of gardens and orchards, evidencing the high degree of culture possible, as also the care and taste whereby such luxuriant growth and development is attained. It contained, in 1902, several state banks with a combined capital of $1,590,000, a national bank with capital of $500,000, numerous churches, a state normal school, and the Academy of Notre Dame, the State Asylum for the Chronic Insane, a United States government building, and the first electric tower erected in America, constructed of iron and two hundred feet in height. Two daily and seven weekly papers and three monthly periodicals are published, and the hotels furnish abundant accommodation for a large number of guests. Iron foundries, machine-shops, tanneries, flour and saw mills, and other branches of manufactures are successfully operated, and fruit is extensively canned and shipped. No. of industries (1900), 344; capital $3,409,517. Pop. 1890, 18,060; 1900, 21,500. See also San José, Vol. XXI, p. 278.

SAN JOSÉ, the capital of Costa Rica, Central America. See San José, Vol. XXI, p. 278.

SAN JOSÉ or SAN JOSÉ DE GUATEMALA, a town and port of Guatemala, 58 miles S.S.W. of the city of Guatemala, with which it is connected by rail. It has only an open roadstead, with an iron pier running out past the surf, and vessels load and discharge by lighters. A very considerable trade is carried on, the yearly imports amounting to about one million two hundred and fifty thousand dollars. Population, about 2,000.

SAN JUAN, a western province of the Argentine Republic, between lat. 30° and 32° S. and long. 68° and 70° W., bounded on the west by Chile, on the north, south and east by the provinces of Rioja, San Luis and Mendoza; has an area of 29,700 square miles; surface varied by mountains and large sandy plains; principal rivers, the San Juan, Jachal, and Bermejo; rich in minerals, having gold, silver, copper, and deposits of coal, but the mining industry is undeveloped. The province is almost entirely devoted to agriculture, which, owing to the dryness of the climate, is carried on principally along the rivers, where irrigation is made use of. The chief productions are corn, wheat, lucerne, fruit, and grapes. Large quantities of a very fine wine are made. Population of the province, in 1901, 94,991. The capital, San Juan, partially destroyed by an earthquake in 1894, had a population of 11,000 in 1901, and was supplied with electric tramways. For the location of the town, see San Juan, XXI, p. 278.

SAN JUAN ARCHIPELAGO. See San Juan Islands, Vol. XXI, p. 279.

SAN JUAN BAUTISTA, a town of Porto Rico; q. v., Vol. XIX, p. 547.

SAN JUAN DEL NORTE. See Greytown, Vol. XI, p. 173.

SAN JUAN DEL SUR or GUARDIA, Nicaragua, a small seaport town on the Pacific Ocean, 20 miles south of Brito at the mouth of the proposed Nicaragua canal, and 68 miles southeast of Managua. It is a station of the submarine telegraphic cable connecting north with San Salvador and south with Panama, and as the nearest Pacific port to Lake Nicaragua, has an active transit trade. C.L.S.

SAN JUAN RIVER. See Nicaragua, Vol. XVII, pp. 490, 491.

SANKEY, Ira David, an American singer and composer; born in Edinburgh, Pa., Aug. 28, 1840. He removed to New Castle, Pa., joined the Methodist Episcopal Church, and became choir-leader, Sunday-school superintendent, and president of the Young Men's Christian Association in that town. In 1870 he met Dwight L. Moody at an international convention of the Young Men's Christian Association at Indianapolis, and became associated with him in his revival services, conducting the singing, etc. He composed and wrote many hymns, and compiled collections of sacred songs, including *Gospel Hymns*, *Sacred Songs and Solos*, which are said to have had a circulation of over 50,000,000 copies and have been translated into many languages. Among his compositions are *The Ninety and Nine; When the Mists Have Rolled Away;* etc. He gave a public library and a Y. M. C. A. building to the town of New Castle. E.E.T.

IRA D. SANKEY.

SANKHYA, a system of Hindu philosophy. See Sanskrit, Vol. XXI, pp. 289–290.

SAN LAZZARO. See Mechitharists, XV, 784.

SAN LEANDRO, California, a seaport town of Alameda County on an inlet of San Francisco Bay, 8 miles by rail S. of Oakland, and 16 miles E. of San Francisco across the bay. It has farming and manufacturing industries and an export trade. Population, 1900, 2,253. C.L.S.

SAN LUCAS, Cape, Mexico, the southermost point of Lower California, between capes Pulmo and Falso. C.L.S.

SAN LUIS, Argentine Republic, a central-western province, bounded north by La Rioja, east by Cordova, south by El Pampater, and west by Mendoza; area, 29,300 square miles. In the north the country rises in the Sierra de San Luis to a height of 6,500 feet, and in the south sinks to level pampas and dry plains. On the west the province is watered by the Rio Salado, while the Rio Quinto drains the central portion. In the sierra gold and copper are mined to a considerable extent, constituting the most profitable industry of the province; other minerals also exploited are zinc, plumbago, lead, iron pyrites and sulphur, while porcelain clays and rock salt occur as marketable products. Irrigation is extensively adopted for agricultural purposes, corn, wheat and clover being raised, the latter for stock-feeding purposes; cattle are largely exported. San Luis, the capital, and Villa Mercedes, connected with the South American railroad systems, are the chief towns. Population, 92,000. C.L.S.

SAN LUIS, town in Pampanga, Luzon, Philippine Islands, 9 m. E. of Bacolor. Pop. 10,298.

SAN LUIS OBISPO, a city and the capital of San Luis Obispo County, in S. W. California, on the Pacific Coast and the S. P. railroads, about 90 m. N. W. of Santa Barbara, and 8 m. from the Pacific Ocean. It is the trade center of a rich mining, agriculture and grazing district. Bituminous rock is quarried for pavements. Population, 1890, 2,995; 1900, 3,021.

SAN MARCOS, Texas, the seat of Hays County, a town 30 miles southwest of Austin, on the San Marcos River, the San Antonio division of the International & Great Northern railroad, and the terminus of a branch of the Missouri, Kansas & Texas system. The U. S. Government maintains a fish culture station here, and among the educational establishments is the Coronal Institute. It is a market town, exporting corn, cotton and cattle. Pop., 1900, 2,292. C.L.S.

SAN MIGUEL, Salvador, an interior town and departmental capital, on the San Miguel River, 9 miles northeast of San Miguel volcano (5,950 feet high), and at the junction of trade routes leading from San Salvador, the capital, 70 miles northwest, to the seaports of La Union on the Gulf of Fonseca and to Jucuaran, on the Pacific Ocean. It is an important market town, noted for its fairs. Population, 24,800. C.L.S.

SAN MIGUEL DE ALLENDE, a town in the state of Guanajuato, central Mexico, situated on the Mexican National railroad, 34 miles N. of Ceyala. Has a telegraph station, dominion express and a college. Population, 15,000.

SAN MIGUEL DE MAYUMO, town in Bulacan, Luzon, Phil. Is. Products abundant. Pop., 20,460.

SAN PABLO, town in S. Central Laguna, Luzon, Phil. Is., 25 m. S. of Santa Cruz, in area of volcanic elevations and lakes and supposed valuable mineral deposits. Population, 19,537.

SAN RAFAEL, California, the seat of Marin County, a city and health resort on the northwest coast of San Francisco Bay, near San Pablo Strait, 15 miles north of San Francisco city, with which it has frequent connection by rail and the San Quentin ferry. It is on divisions of the California Northwestern and the North Pacific Coast railroads, and exports the products of an agricultural section, with cattle-breeding, dairying, milling and lumbering interests. Population, 1890, 3,290; 1900, 3,879. C.L.S.

SAN SABA, a town and the capital of a county of

the same name, central Texas, on the San Saba River. Its railroad station is Lometa, on the Gulf, Colorado and Santa Fé railroad. The surrounding country is devoted to farming and stock-raising. Population, 1900, 750.

SAN SALVADOR OR NUEVA SAN SALVADOR, the capital of the Central American republic of the same name, an interior city 50 miles by rail northeast of the Pacific seaport town of Acajutla, and 26 miles north of Libertad, the nearest Pacific port, from which a railroad also is projected to the capital. The city is situated south of the volcano of San Salvador, between wooded heights, 2,900 feet above sea-level, in the valley of a small river flowing to the Pacific. Founded by Jorge Alvarado in 1528, the city suffered from disastrous earthquakes in 1539, 1854, 1873, 1879 and 1891, and now occupies a position 20 miles south of the original site, and 7 miles southwest of the second city, built after 1539, and which, when destroyed in 1854, had handsome public buildings and residences and over 25,000 inhabitants. The buildings of the new city are of wood and do not exceed two stories in height. San Salvador has manufactures of iron ware and cotton goods, and is the gathering and distributing center of an agricultural region, with sugar and indigo as the chief products. Population of city and Federal district, 60,000. C.L.S.

SAN SALVADOR ISLAND. See COLUMBUS, Vol. VI, p. 155.

SANT, JAMES, an English painter; born in Croydon, April 23, 1820. He received most of his instruction at the Royal Academy; was made a member of the Royal Academy in 1870, and in 1871 principal painter in ordinary to the Queen. Among his most widely known works are the *Infant Samuel; Little Red Riding-Hood; Dick Whittington; Retrospection; Saxon Women*, and the *Miller's Daughter*. For the Countess of Waldegrave he painted 22 portraits of members of her circle, including the Duchess of Sutherland, Lady Constance Grosvenor, the Duchess of Wellington and Earl Grey. He was commissioned to paint a large portrait of the Queen and the three eldest children of the Prince of Wales and another portrait of the Queen for the Turkish embassy.

SANTA ANA, California, the seat of Orange County, a city 35 miles southeast of Los Angeles, and 10 miles northeast of Newport Beach on the Pacific, at a junction of the Southern California and the Southern Pacific Company railroads. It is an important citrus-fruit growing center with a large export trade, and numerous industrial establishments, including wineries, lumber mills, machine works, etc. Population, 1890, 3,628; 1900, 4,933. C.L.S.

SANTA ANA, Salvador, an interior town and departmental capital in the west of the republic near the Gautemala boundary 11 miles north of the active volcano of Lematepec or Santa Ana (7,900 feet high) and 36 miles northwest of San Salvador, with which it is connected by rail as also with the seaport town of Acajutla on the Pacific Ocean, 50 miles to the south. Santa Ana is an educational center with a state university and a female college, and is in a sugar-growing and mining region exporting silver, copper, zinc and iron. Population, 48,000. C.L.S.

SANTA BARBARA, California, the seat of a county of the same name, a seaport city on the Pacific Ocean and on a division of the Southern Pacific Company railroad, 280 miles southeast of San Francisco and 110 miles northwest of Los Angeles, with which and other Pacific ports it has periodical steamer connection. It has a good harbor and bathing beach and the city which grew up around the well preserved and picturesque Spanish mission founded here in 1780, occupies a healthful situation on a gentle coastal slope at the foot of the Santa Ynez Mountains. It is a noted summer resort, especially for the inhabitants of San Francisco, and its sulphur and other medicinal springs attract health seekers. The citrus-fruit and flower-growing industries are extensive. Population, 1890, 5,864; 1900, 6,587. C.L.S.

SANTA CLARA, a thriving town of western California, charmingly situated in the fertile Santa Clara valley, in Santa Clara County, on the Southern Pacific railroad, about 3 miles W. of San José and 45 miles S. of San Francisco. The town has an extensive distillery and winery, a large tannery and manufactures of windmills. It is the seat of Santa Clara College, a Catholic institution, and of the University of the Pacific, at College Park, one mile from the town, a Methodist Episcopal institution established in 1851, and having, in 1901, 12 instructors, 247 students, and a library of 5,000 volumes. Population, 1890, 2,891; 1900, 3,650.

SANTA CRUZ, California, the seat of a county of the same name, a city of the Pacific coast, on the north shore of Monterey Bay, and the terminus of two divisions of the Southern Pacific Company railroad 80 miles south of San Francisco, with which it has regular passenger and freight steamer connection as also with all prominent coast ports. It is one of the celebrated summer and winter resorts of the "Golden State" and the commercial and manufacturing trade center of the neighboring fruit, vine, and cattle-farming region which has also valuable commercial deposits of bitumen. Its manufacturing establishments include gunpowder works, tanneries, lumber, borax, soap and glue factories. Population, 1890, 5,596; 1900, 5,659. C.L.S.

SANTA CRUZ, ANDRES DE. See PERU, Vol. XVIII, p. 692.

SANTA CRUZ DE SANTIAGO. See CANARY ISLANDS, Vol. IV, p. 706.

SANTA CRUZ ISLANDS. See NEW HEBRIDES, Vol. XVII, pp. 405, 406.

SANTA FÉ, the capital and largest city of the territory of New Mexico. (For general geographical and historical article, see SANTA FÉ, Vol. XXI, pp. 310, 311.) It is annually increasing and extending, and is an important military post. Within late years the old city of adobes has given place to a new city with all the modern appointments. It is the seat of Romona School, for Indian girls; Presbyterian Academy, established in 1881; St. Michael's College, a

Roman Catholic institution established in 1859, and having 12 instructors and 175 students in 1890; and the University of New Mexico, opened in 1881 under the control of the Congregationalists, and having, in 1888, 10 instructors and 185 students. Population, 1890, 6,185; 1900, 5,603.

SANTALACEÆ, a family of parasitic shrubs. See PARASITISM, Vol. XVIII, p. 270.

SANTAL-WOOD OR SANDERS-WOOD. See SANDALWOOD, Vol. XXI, p. 268.

SANTA MARIA, DOMINGO, a Chilian jurist; born in Santiago, Chile, August 4, 1825. He studied law, entered politics and was exiled in 1852. On his return he was Minister of the Treasury in 1863 and was appointed Judge of the Supreme Court in 1867. In 1874 he was made president of the Court of Appeals. In 1881 he was elected president of the Republic, and in 1886 was again made president of the Court of Appeals. He died in Santiago, June, 1890. W.M.C.

SANTA MARIA DI CAPUA. See CAPUA, Vol. V.

SANTA MARTA, Colombia, the capital of the department of Magdalena, a seaport city at the northeastern extremity of the entrance to the Cienaga de Santa Marta, a shallow lagoon on the Caribbean Sea. Founded by Spaniards in 1525 it was frequently attacked by Indians and by French and English buccaneers. It is the terminus of a railroad projected past San Juan de la Cienaga on the southeast to join at Calamar on the Magdalena with the railroad to Cartagena and exports the products of the region. It has beautiful surroundings, with the Sierra Nevada de Santa Marta on the S.E. Pop., 4,000. C.L.S.

SANTA MONICA, California, a city and seaside resort on Santa Monica Bay, an indentation of the Pacific in Los Angeles County, 17 miles by steam and electric railroads west of Los Angeles. It is the terminus of a branch of the Southern California railroad, and is on a division of the Southern Pacific Company system, which has a wharf here a mile long. Santa Monica is a progressive town with a fine beach, and beautiful homes, sheltered on the north by the Santa Monica mountains. Adjoining the town on the south is the large summer colony of Ocean Park. Population, 1890, 1,580; 1900, 3,057. C.L.S.

SANTANDER, FRANCISCO DE PAULA (1792–1840), a patriot-soldier, lieutenant to Bolivar; refugee in 1828–31; President of New Granada 1832–37. See also BOLIVAR, Vol. IV, pp. 9–10.

SANTA PAULA, California, a township of Ventura Co., organized since 1890 from part of Saticoy twp., 65 miles N.W. of Los Angeles, on the Santa Barbara branch of the Southern Pacific Company railroad. It is a town of varied interests; its scenic beauties and sulphur springs attract numerous visitors and health seekers and it is the trade center of the Santa Clara valley with citrus-fruit, bean-growing and honey-producing interests, and petroleum wells, asphalt, lumber and stone quarries. Pop., 1900, 3,583. C.L.S.

SANTAREM, MANUEL FRANCISCO DE BARROS E SOUSA, VISCOUNT OF (1791–1856), a Portuguese courtier and historian who lived 23 years in Paris, and died there. See PORTUGAL, Vol. XIX, p. 556.

SANTA ROSA, California, the seat of Sonoma County, a city and railway junction 50 miles north of San Francisco on two divisions of the California Northwestern railroad, and terminus of a branch line of the Southern Pacific Company system. It lies in a well watered and productive valley near the convergence of two ridges of the coast range, and is the commercial center of a farming, fruit, grape, flower-growing and wine-manufacturing region. Population, 1900, 6,673. C.L.S.

SANTA ROSALIA, Mexico, a city in the state of Chihuahua at the confluence of the Nonoava and Conchos rivers, and on a division of the Mexican Central railroad, 90 miles southeast of Chihuahua. It is a river port, market town, and health resort, frequented for its hot sulphur springs. Population, 8,000. C.L.S.

SANTEE, a navigable river of South Carolina, flowing into the Atlantic through two outlets, near the southern boundary of Georgetown County, 20 miles south of Georgetown. It is formed by the junction of the Congaree and Wateree rivers at Congaree, 110 miles above its outlets. C.L.S.

SANTI, GIOVANNI. See RAPHAEL, XX, 286.

SANTIAGO DE CUBA. See Vol. XXI, 314. For a full account of the siege and capture of the city by the American troops under Gen. Shafter (June–July, 1898), and of the naval battle off the harbor, between the American and Spanish fleets, July 3, 1898, see UNITED STATES, Vol. XXIX, pp. 388–392. The surrender to Gen. Shafter (July 17, 1898) included not only the city, but also the eastern part of the province of Santiago de Cuba. On July 20, Brig.-Gen. Leonard Wood was appointed military governor of the city, and on Oct. 7 of the province also; and he speedily effected a marvelous improvement in its sanitary condition and in the enforcement of order and good government. The streets were policed, cleanliness was enforced, public schools were established, roads to Holguin and Guantanamo were begun, and the government buildings, arsenals, and regimental quarters were remodeled, repaired and refurnished. On Oct. 21 he issued a proclamation providing for the enforcement of the principles of civil and religious liberty and of justice; and on Dec. 2 he installed the supreme court, reorganized and composed of Cubans. In March, 1899, it was reported that the city was rapidly becoming Americanized, and had several American hotels and restaurants, an American bank, 2 American express companies, a meteorological station, a free postal delivery system, with drop boxes for letters, and mails two or three times a week to the towns and villages throughout the province. Pop. of province, 1900, 327,715.

SANTIAGO DE LOS CABALLEROS, Haiti, a town of the Republic of Santo Domingo, on the Yaqui del Norte River, 30 miles by rail from Puerto Plata northward on the Atlantic, and 85 miles from Santo Domingo city on the south coast. It is a healthful hill town, and a tobacco-growing center. Population, 8,000. C.L.S.

SANTO DOMINGO, REPUBLIC OF. See HAYTI, in Vol. XI, p. 487, and in these Supplements.

SANTONIN, a white crystalline substance obtained from Santonica (German or Levantic wormseed). It is anthelmintic in doses of from one to four grains (.05 to .25 grams.). Sometimes it exerts a peculiar effect on the sight, everything looking as if seen through a yellow glass. Large doses are poisonous.

SANTORIN, an island. Same as THERA, Vol. XXIII, p. 299.

SÃO FRANCISCO RIVER. See BRAZIL, Vol. IV, p. 199.

SAÔNE, a river. See RHONE, Vol. XX, 542.

SAP. See *Absorption*, under PHYSIOLOGY, Vol. XIX, pp. 51–52.

SAPAJOU. See APE, Vol. II, p. 134.

SAPAN-WOOD. See SAPPAN-WOOD, Vol. XXI, p. 317.

SAPODILLA (*Achras sapota*), a tree of the order *Sapotaceæ*, the fruit of which resembles a bergamot pear in shape and size. W.R.B.

SAPONIFICATION. See OILS, Vol. XVII, p. 761.

SAPONIN. See SOAP-BARK, Vol. XXII, 216.

SAPOTACEÆ, a small family of shrubs and trees containing about four hundred tropical species, commonly known as the Sapodilla family. Some genera have excessively hard wood, known as ironwood (*Sideroxylon* and *Bumelia*). The latex of some genera (*Palaquium*, *Mimusops* and *Payenia*) is the raw material of gutta-percha. Several genera bear highly prized berry-like fruits, as sapodilla and star-apple, and the seeds of *Bassia* yield an abundant fatty oil.

SAPPERS. See FORTIFICATION, Vol. IX, p. 403.

SAPROPHYTES, a name given to plants without chlorophyll, which obtain their food from decaying organic material, or from the products of living organisms. Among saprophytes are the well-known mushrooms and toadstools. See also BIOLOGY, Vol. III, p. 597; and BACTERIOLOGY, in these Supplements.

SAP-SUCKER (*Sphyrapicus varius*), a North American bird of the woodpecker family (*Picidæ*), often called the yellow-breasted woodpecker. Like other members of the family, it bores holes in trees; but, unlike the others, this bird is said not to be in search of insect-larvæ, but the sap, which constitutes its food. Some authorities claim that the bird seeks insect-larvæ as well as sap. Sometimes fruit and ornamental trees, especially maple, are injured by the numerous punctures made by this bird.

SAPWOOD. See BOTANY, Vol. IV, p. 89.

SARACENIC ART. See ARCHITECTURE, Vol. II, pp. 389–392.

SARAGOSSA. See ZARAGOSA, Vol. XXIV, p. 808.

SARAGOSSA, MAID OF. See AGUSTINA, in these Supplements.

SARAJEVO. See BOSNA SERAI, Vol. IV, p. 60.

SARAKHS. See PERSIA, Vol. XVIII, p. 629.

SARANAC LAKE, a village of Franklin County, northeastern New York, on the Chateaugay, New York Central and Hudson River, and Saranac and Lake Placid railroads, 40 miles S. of Malone and about 60 miles S.W. of Plattsburg. It is best known as the center of one of the most beautiful regions in the Adirondack Mountains. Three lakes, the Upper, Middle and Lower Saranac lakes, lie near the village, making it a most delightful summer resort. The Adirondack Sanatorium, an institution much visited by persons suffering from pulmonary complaints, is located here. Population 1890, 768; 1900, 2,594.

SARASATE, HIS EXCELLENCY PABLO MARTIN MELITON DE, violinist; was born at Pampeluna, Spain, on March 10, 1844, and was educated at the Paris Conservatoire. He has played at concerts with distinguished success in every country of the civilized world excepting Australia, and has received distinguished decorations from most of the sovereigns of Europe. He is also honorary professor at several conservatories of music. As a violinist virtuoso he ranks among the foremost of his time, and he is also a composer of merit. W.F.J.

SARASWATI. See ALLAHABAD, Vol. I, p. 509.

SARATOGA, BATTLE OF. See UNITED STATES, Vol. XXIII, p. 785; and SARATOGA SPRINGS, in these Supplements.

SARATOGA SPRINGS, a popular inland watering-place of New York state, which has changed little since the account contained under SARATOGA SPRINGS, Vol. XXI, 320–321, was written. It has grown, if anything, more beautiful; its shaded avenues are grander, and the houses of its rich visitants more numerous. With the suppression of its gambling-houses and the cessation of horse-racing, its popularity has, if anything, increased. It is essentially the city of conventions for all learned and prominent societies. Saratoga Lake, distant five miles from the town, has been connected with it by an electric surface railroad, and the lake has become a popular meeting-place for rowing-crews in an annual regatta. The mineral springs described under MINERAL WATERS, Vol. XVI, p. 456, are, if anything, more numerous, and in greater popular favor. It would seem impossible to sink a shaft in the vicinity of Saratoga Springs without discovering some new mineral water, differing slightly in analysis from those already in popular favor. The prevailing character of the waters is cathartic.

Sixteen miles distant, at Schuylerville and Bemis Heights, reached by railroad, driving, or by fine roads for bicycling, rises a magnificent monument in memory of Burgoyne's surrender after the battles of Saratoga. These conflicts took place Sept. 19, Oct. 7, and Oct. 17, 1777. Burgoyne, with his army, was trying to effect a junction with the royalist forces from New York. He crossed the Hudson and attempted to storm the strong American position held by Gates at Bemis Heights. The battle was sanguinary, both British and Americans losing a fourth of the men in action. Then for 18 days nothing was done. News came to Burgoyne that his supplies were cut off. He was forced to again attack the strong position of the American army, though he had but 4,000 men as opposed to 16,000. With 1,500 picked men under Fraser he tried to turn the American flank, and for the second time Benedict Arnold thwarted his plans. Both Fraser

and Arnold were wounded and disabled. On October 17th, Gates, with 20,000 men, followed the retreating army, who found their passage across the Hudson cut off. Burgoyne was unable to hear from Clinton, and accordingly treated with a view to surrender. The terms agreed upon, called the "Convention of Saratoga," permitted the British to march out with the honors of war, lay down their

SARATOGA MONUMENT.

arms, march to Boston, embark for England and not serve against Americans again. The British marched out Oct. 17th, but the terms of the convention were not sanctioned by Congress, and while the officers were paroled the men were kept prisoners for a considerable period. The scene of the battle-ground, with its handsome monument, is a place of popular excursion. Pop. 1900, 12,409.

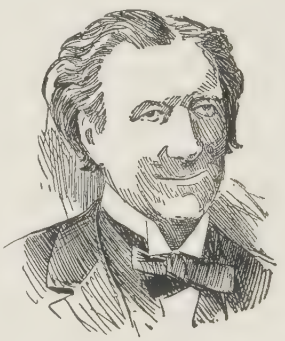
SARAVIA, a town of the Philippine Islands on the N. W. coast of the island of Negros. Sugar culture, the industry. Pop. 15,304.

SARCEY, Francisque, a French dramatic critic and novelist; born in Dourdan, Oct. 8, 1828; educated at the normal school; first wrote for the *Figaro* and the *Revue Européenne;* in 1859 accepted the post of dramatic critic to the newly-founded *Opinion Nationale*, and in 1867 accepted a similar post on the *Temps*. He published a *History of the Siege of Paris; Comédiens et Comédiennes* (two series, 1876 and 1884); *Souvenirs of My Youth* (1885) and *Souvenirs of My Age* (1892); and *The Theatre* (1893). Died in Paris, March 15, 1899.

SARCOZINE, methyl-amido-acetic acid, obtained by splitting up creatine, or creatinine, or from methylamine and chloracetic acid. It forms rhombic prisms, soluble in water, little soluble in alcohol. It has a sweet taste, and melts at 210° to 215°, with partial decomposition. Taken internally, most of it passes through the system unchanged.

SARDINIA, a former kingdom. By the treaty of Utrecht the house of Savoy added to their extensive possessions the principality of Montferrat and the island kingdom of Sicily. At this time Sardinia was subject to Austria, and in 1720 the latter exchanged Sardinia for Sicily. The title of king, which had gone with Sicily, was, however, retained by the Duke of Savoy and attached to Sardinia. A new kingdom of Sardinia thus came into existence. In 1831 the direct male line of the house of Savoy became extinct, the crown falling to Charles Albert (1831–49), the head of the branch Savoy-Carignano, founded by a younger son of Charles Emmanuel, Thomas Francis, born in 1596. King Charles abdicated his throne March 23, 1849, in favor of his son, Victor Emmanuel II. By the peace of Zurich, Sardinia obtained Lombardy, with the exception of Mantua, part of the papal states and the duchies of Parma and Modena. In 1860 Parma, Modena, the Romagna, Tuscany, Sicily, Naples, Marche and Umbria joined Sardinia. In this year Savoy and Nice were ceded to France. March 17, 1861, Victor Emmanuel was declared king of Italy. The remaining part of Lombardy and Venetia was added in 1866, and the papal states (Province of Rome) were taken possession of Sept. 20, 1870, and annexed. For the merging of Sardinia into the kingdom of Italy, see Italy, Vol. XIII, pp. 499–500; and Savoy, Vol. XXI, p. 358.

SARDOU, Victorien, dramatist; was born in Paris on September 6, 1831, and in early life studied for the medical profession. His tastes led him to the theater, and he essayed dramatic composition. His first play, a comedy, was not successful, but he persisted and soon won for himself an assured place in the dramatic world. For many years he has been the most successful writer of "emotional" and "problem" plays in France. His early works included *Les Premières Armes de Figaro* (1859); *Monsieur Garat* (1860), and *Les Prés-St.-Gervais* (1862). His first brilliant success was *Les Pattes de Mouche* (1860), which was closely followed by the even more popular *Nos Intimes* (1861). Other noteworthy pieces have been *Patrie* (1869), a patriotic play; *Rabagas* (1872), which was supposed to refer to Gambetta; *L'Oncle Sam* (1873), a satire on America; *Dora* (1877); *Daniel Rochat* (1880); *Odette* (1881); *Divorçons* (1881); *Madame Sans-Gêne* (1895), and *Robespierre* (1902). He wrote for Sarah Bernhardt a number of striking dramas, which comprise *Fédora* (1882); *Théodora* (1884); *La Tosca* (1887), and *Cleopatra* (1890). Other of his plays are *La Taverne* (1854); *Les Gens Nerveux* (1859); *Candide* (1862); *La Famille Benoiton* (1865); *Belle Maman* (1889); *Thermidor* (1891); *Pamela* (1898); *Dante* (1903); *Les Ganaches* (1861); *Les Vieux Garçons* (1865);



VICTORIEN SARDOU.

Nos Bons Villageois (1866); *Maison Neuve* (1866); *Gismonda* (1894); *Spiritisme* (1897), and *La Haine* (1874). His *Thermidor*, a play of the French Revolution, excited great enthusiasm, but was soon suppressed by the government for political reasons. Many of his pieces have been translated into English and have been performed in the United States, especially by the late Fanny Davenport (q. v., in these Supplements). His style is usually brilliant, but essentially artificial and superficial, so that while his plays have the elements of popularity they give little promise of becoming classics. He was decorated with the Legion of Honor in 1863, and was elected a member of the French Academy in 1877. W.F.J.

SARGENT, Aaron A., an American public man; born in Newburyport, Mass., Sept. 28, 1827. He learned the printer's trade; removed to California in 1849; studied law; and in 1854 was admitted to the bar. He was district attorney for Nevada County, Cal., 1855–56; sat as a Representative in Congress from California from July 4, 1861, to March 3, 1863, and from March 4, 1869, to March 3, 1873; was elected Senator as a Republican in the place of Cornelius Cole, and served from March 3, 1873, to March 3, 1879. In 1882 he was appointed minister to Germany, by President Garfield, but later resigned his office on account of the action of the German government in excluding American pork from the empire, making his incumbency personally distasteful. He was offered the Russian mission, but declined it. He died in San Francisco, Cal., Aug. 14, 1887. E.E.T.

SARGENT, Charles Sprague, arboriculturist; was born in Boston on April 24, 1841, and was graduated from Harvard College in 1862. He served in the Civil War as an officer of Massachusetts troops. In 1873 he became director of the Arnold Arboretum and in 1879 also professor of arboriculture at Harvard. He planned the Jesup collection of North American woods for the American Museum of Natural History, was chairman of the commission for the preservation of the Adirondack forests, and of the commission appointed by the National Academy of Sciences to formulate a forest policy for the United States, was editor of *Garden and Forest* in 1887–97, and has written several important treatises and reports upon forestry. W.F.J.

SARGENT, Epes, man of letters; was born at Gloucester, Massachusetts, on September 27, 1813, and was a journalist, poet, novelist, and dramatist, and editor of literary works. Among his best known works are *Change Makes Change*, a comedy; *The Priestess*, a tragedy; *Wealth and Worth*, a novel; *Peculiar: A Tale of the Great Transition; A Life of Henry Clay; Songs of the Sea; A Cyclopædia of English and American Poetry*, and *Sargent's Standard Speaker*, the last a notable collection of prose and verse for reading and reciting. His song *A Life on the Ocean Wave* is familiar the world around. He died in Boston on December 31, 1880. W.F.J.

SARGENT, John Singer, artist; was born at Florence, Italy, on January 12, 1856, the son of American parents, and was educated in Europe, studying art under Carolus Duran and other eminent masters. His first picture at the Salon was *Going Fishing*, in 1878. In 1884 he settled in London; he visited New York in 1887, and received orders for many portraits; in 1892 he joined Edwin Abbey and worked with him on some large decorative works, and in 1894 created a furore at the Royal Academy in London by his exhibition of those works. In recent years he has devoted himself chiefly to portrait work; has painted many pictures of public men and social leaders, and in that important department of art is regarded by both European and American critics as having probably no superior, if, indeed, any equal, in the world. He has received many medals and prizes, and has been elected to associate membership in the Royal Academy, the Societe des Beaux Arts, etc., and is an officer of the Legion of Honor. W.F.J.

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JOHN S. SARGENT.

SARGENT, Winthrop, lawyer and historian; was born in Philadelphia, Pennsylvania, on September 23, 1825, practiced with success at the bar, spent most of his life in New York city, and wrote a number of historical works, including a highly esteemed *History of an Expedition Against Fort Duquesne in 1755 Under General Braddock* (1855), and *The Life and Career of Major John André* (1861). He also wrote *The Loyalist Poetry of the Revolution*, and edited the compilation made in it. He died in Paris on May 18, 1870. W.F.J.

SARGON, King. See Babylonia, Vol. III, p. 162.

SARMIENTO, Domingo Faustina (1811–1888), President of the Argentine Republic. See Argentine Republic, Vol. II, pp. 16, 17.

SARMIENTO DE GAMBOA, Pedro. (1530–1589.) See Patagonia, Vol. XVIII, p. 358.

SARNIA, a city and port of entry, and the capital of Lambton County, southwestern Ontario, Canada, on the St. Clair River opposite Port Huron, with which it is connected by ferry, and on the Grand Trunk and the Erie and Huron railways, at the Canadian end of the tunnel under the St. Clair River, about 60 miles W. of London. It is situated in a region having important lumber, petroleum and agricultural interests. The principal industries of the city are woolen and planing mills, foundries, machine-shops, breweries, tanneries, etc. Sarnia is a stopping-place for vessels bound for the northern lakes, and has a large shipping-trade. Point Edward, formerly Port Sarnia, is now within the city limits. Population, 1891, 6,693; 1901, 8,176.